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ABSTRACT

Over the past quarter of a century, the Monitoring the Future study has tracked young American's use of psychoactive substances, both illicit and licit. In this volume, findings are presented on the prevalence and trends of drug use and related factors for secondary school students (eight, tenth, and twelfth graders). Distinctions are made among demographic subgroups of these populations based on gender; college plans; region of the country; population density; parents' education; and race/ethnicity. This study demonstrates that key attitudes and beliefs about use of the various drugs are important determinants of trends in use over time. Attitudes are tracked as well as students' perceptions of certain relevant aspects of their social environment, including perceived availability of substances, peer norms, use by friends, and exposure to use. Chapter One provides an introduction. Chapter Two gives an overview of key findings. Chapter Three presents study design and the procedures. Chapter Four discusses the prevalence of drug use among the different grades. Chapter Five explains trends in drug use. Chapter Six looks at the incidence of drug use in the lower grades. Chapter Seven discusses the degree and duration of drug-induced highs. Chapter Eight details attitudes and beliefs about drug use. Chapter Nine includes the influence of the social milieu. Chapter Ten explains other findings from the study. (Contains 5 appendixes, 152 tables, 105 figures, and references.) (JDM)

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National Institute on Drug Abuse

Monitoring the Future

National Survey Results on Drug Use, 1975-1999

Volume I:

Secondary School Students

1999

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MONITORING THE FUTURE

NATIONAL SURVEY RESULTS ON DRUG USE, 1975-1999

Volume I

Secondary School Students

by

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Chapter 1

INTRODUCTION

In the last third of the twentieth century we have seen an epidemic of illicit drug use among American young people which is unparalleled in this country's history. In addition, widespread alcohol and tobacco use among our youth is a topic of increasing public concern and policy attention, given the consequences for both young people and the rest of society. Since 1975, the Monitoring the Future project has provided the nation with an important window through which to view these problems and thus gain a better understanding of their changing nature and some of the dynamics that explain them. This series of annual monographs has been the primary vehicle for disseminating many of the epidemiological findings from the study, which has grown substantially in its coverage and size over the years.

This two-volume monograph reports the results of the twenty-fifth (1999) national survey of drug use and related attitudes and beliefs among American high school seniors, the twentieth such survey of American college students, and the ninth such survey of eighth- and tenth-grade students. Results from the secondary school samples of eighth, tenth, and twelfth graders are contained in Volume I, while the results from college students and young adults are reported in Volume II. This year, for the first time, Volume I on secondary school students was preceded by an advance summary of its key findings, *Monitoring the Future National Results on Adolescent Drug Use: Overview of Key Findings, 1999.*[1] The report can be obtained on the Web at http://www.MonitoringTheFuture.org or by contacting the authors at the Institute for Social Research, The University of Michigan, Ann Arbor, Michigan, 48106-1248.

All data presented here derive from the ongoing national research and reporting program entitled *Monitoring the Future: A Continuing Study of American Youth*, which is conducted at the University of Michigan's Institute for Social Research and has been funded through a series of investigator-initiated research grants from the National Institute on Drug Abuse. In the past the study was sometimes called the National High School Senior Survey because each year since 1975 a representative sample of all seniors in public and private high schools in the coterminous United States has been surveyed. However, the study also surveys (a) representative samples of eighth- and tenth-grade students, (b) representative samples of young adults from previous graduating classes, who are administered follow-up surveys by mail and (c) representative samples of American college students one to four years past high school, who are a part of these follow-up samples.

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[1] Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (2000). *Monitoring the Future National Results on Adolescent Drug Use: Overview of Key Findings, 1999* (NIH Publication No. 00-4690). Rockville, MD: National Institute on Drug Abuse, c. 56 pp.

SURVEYS OF SECONDARY SCHOOL STUDENTS

Two of the major topics included in this series of annual reports are (1) the prevalence and frequency of drug use among American secondary school students (specifically, in eighth, tenth, and twelfth grades) and (2) trends in use by those students. Distinctions are made among important demographic subgroups in these populations based on gender, college plans, region of the country, population density, parents' education, and race/ethnicity. Data on grade of first use, trends in use at lower grade levels, and intensity of drug use also are reported. Key attitudes and beliefs about use of the various drugs have been demonstrated by this study to be important determinants of trends in use over time. Therefore, they are also tracked, as are students' perceptions of certain relevant aspects of the social environment—in particular, perceived availability, peer norms, use by friends, and exposure to use.

SURVEYS OF COLLEGE STUDENTS AND YOUNG ADULTS GENERALLY

Also included in this report series are findings on the prevalence and trends in drug use among young adults who have completed high school. These data are reported primarily in Volume II, although a brief summary of them is given in Chapter 2 of this volume, "Overview of Key Findings." The period of young adulthood (here defined as late teens to early thirties) is particularly important because it has tended to be the period of peak use for many drugs.

The Monitoring the Future study design calls for biennial follow-ups—through age 32—of a subsample of the participants in each participating senior class, beginning with the class of 1976. In 1999, representative samples of the graduating classes of 1985 through 1998, corresponding to modal ages of 19 to 32, provided the panel data. Because the same questionnaire forms are used in all of these follow-ups, it is possible to integrate the data across this age band. Comprehensive results from this young adult population are presented in Volume II.[2]

Two chapters in Volume II present data on college students specifically. Trend data are provided since 1980, the first year that a national sample of college students one to four years past high school was available from the follow-up survey. College students have not usually been well represented in national household surveys because many college students live on campus in group dwellings (dormitories, fraternities, and sororities) that often are not included in household surveys. (The National Household Survey on Drug Abuse, conducted in earlier years by NIDA and now by the Substance Abuse and Mental Health Services Administration, was revised in 1991 to include such group dwellings.) Twenty surveys on substance use among American college students have now been completed, encompassing a nineteen-year period.

[2] Older cohorts are now followed up again at ages 35 and 40 using somewhat different questionnaires.

CONTENT AREAS COVERED IN THIS REPORT

Initially, eleven separate classes of drugs were distinguished for this series of reports: marijuana (including hashish), inhalants, hallucinogens, cocaine, heroin, opiates other than heroin (both natural and synthetic), stimulants (more specifically, amphetamines), sedatives, tranquilizers, alcohol, and tobacco. This particular organization of drug use classes was chosen to heighten comparability with a parallel series of publications based on the National Household Surveys on Drug Abuse. Separate statistics also are presented for several subclasses of drugs within these more general classes: PCP and LSD (both hallucinogens), barbiturates and methaqualone (both sedatives), the amyl and butyl nitrites (both inhalants), crystal methamphetamine ("ice"), and crack and other cocaine. A number of these drugs appeared on the American scene after the study began and were added to the twelfth-grade questionnaires in subsequent years. Trend data for PCP and nitrites are available since 1979, when questions about the use of these drugs were added to the study because of increasing concern over their rising popularity and possibly deleterious effects. For similar reasons, a single question about crack cocaine was added to the 1986 survey and more detailed questions on crack and other cocaine were added in 1987. Questions about MDMA, or "ecstasy," were added in 1989 to the follow-up surveys only and in 1996 to the eighth-, tenth-, and twelfth-grade surveys. Questions about crystal methamphetamine ("ice") were added in 1990. Barbiturates and methaqualone, two components of the sedative class as used here, have been measured separately from the outset. Data for them are presented separately because their trend lines have proved to be quite different. Questions about anabolic steroids were added in 1989 because of reports of their increasing illicit use among young people. Questions about smokeless tobacco were added in 1986, while cigarette use has been covered since the study's inception. In 1991 questions about "getting drunk" were added to the long-standing set of questions on alcohol use. A question about Rohypnol was added to the secondary school questionnaires in 1996. Special tables on the use of heroin by injection, as well as by means other than injection, are contained in Chapters 4 and 5 on prevalence and trends in use. New questions distinguishing these two types of use were introduced in the 1995 survey. The 1999 survey incorporates a new question on the use of methamphetamines, and the 2000 survey will add questions on the use of two additional "club drugs," GHB and ketamine.

For drugs other than alcohol, cigarettes, smokeless tobacco, inhalants, and nonprescription stimulants, practically all of the information reported here deals with illicit use of controlled substances. Respondents are asked to exclude any occasions on which they used any of the psychotherapeutic drugs under medical supervision. (Some data on the medically supervised use of such drugs are contained in the full 1977, 1978, 1981, and 1983 volumes in this series, and an earlier article discussed trends in the medical use of these drugs.[3])

Throughout this report we have chosen to focus attention on drug use at the higher frequency levels rather than simply to report proportions that have ever used various drugs. This is done to

[3]Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1987). Psychotherapeutic, licit, and illicit use of drugs among adolescents: An epidemiological perspective. *Journal of Adolescent Health Care, 8*, 36-51.

help differentiate levels of seriousness, or extent, of drug involvement. While there is no public consensus on what levels or patterns of use constitute "abuse," there is surely a consensus that higher levels of use are more likely than lower levels to have detrimental effects for the user and society. We have also introduced indirect measures of dosage per occasion by asking respondents the duration and intensity of the highs they usually experience with each type of drug. They have shown some interesting trends over the years. Chapter 7 reports those results.

For both licit and illicit drugs, separate chapters are devoted to various variables: grade of first use; the students' own attitudes and beliefs; related attitudes, beliefs, and behaviors of others in their social environment, and perceived drug availability. Some of these variables served to explain observed secular trends in use.

Chapter 10, "Other Findings from the Study," discusses use of nonprescription stimulants, including diet pills, stay-awake pills, and the "look-alike" pseudo-amphetamines. Questions on these substances were placed in the survey beginning in 1982 because the use of them appeared to be on the rise and because it appeared that some respondents inappropriately included them in their answers about amphetamine use. That inappropriate inclusion affected some of the observed trends until the clarification in 1982.

Chapter 10 also presents trend results from a set of questions about cumulative lifetime marijuana use at a daily or near-daily level. These questions were added to enable us to develop a more complete individual history of daily use over a period of years. They reveal some interesting facts about the frequent users of this drug.

This volume also contains an appendix on how to calculate confidence intervals for point estimates and how to calculate statistics testing the significance of changes over time or of differences between subgroups. While many tables in these volumes already contain such statistics for selected point estimates and selected change intervals, some readers may wish to conduct additional computations. Appendix C provides the necessary formulas and design effect corrections to permit such computations.

The reader's attention is also called to Appendix D, which presents supplementary tables providing cross-time trends in the use of various drugs for a number of demographic subgroups in the population. Specifically, subgroups are differentiated on the basis of gender, college plans, region of the country, size of the community, education level of the parents (a proxy for socioeconomic status), and racial/ethnic group. The tables document a number of important subgroup differences in both levels of drug use and cross-time trends in drug use. Appendix B supplies the exact definitions used to distinguish these various subgroups. Appendix E provides trends (for 12th grade only) on individual drugs within the following general classes: hallucinogens, amphetamines, tranquilizers, and sedatives.

PURPOSES AND RATIONALE FOR THIS RESEARCH

Perhaps no area has proven more clearly appropriate for the application of systematic research and reporting than the field of substance abuse. It has been, and remains, a rapidly changing field. It has great importance for the well-being of the nation, and a large amount of legislative and programmatic intervention is addressed to it, particularly in response to the increases in adolescent smoking and illicit drug use we have been reporting in the 1990s.

Young people are often at the leading edge of social change—and this has been particularly true of drug use. The massive upsurge in illicit drug use during the last twenty-five to thirty years has proven to be a youth phenomenon, and the "relapse" in the drug epidemic in the early '90s occurred almost exclusively among adolescents, as this study and others have demonstrated. Adolescents and young adults in their twenties also fell into the age groups at the highest risk for illicit drug use. The original epidemic began on the nation's college campuses and then spread downward in age, but the more recent relapse phase in the epidemic manifested itself first among secondary school students and now is moving upward in age as those cohorts mature. From one year to the next, particular drugs rise or fall in popularity, and related problems occur for youth, their families, governmental agencies, and society as a whole.

One of the major purposes of the Monitoring the Future series is to develop an accurate picture of current drug use and trends. This is a formidable task, given the illegal nature of most of the phenomena under study. A reasonably accurate picture of the basic size and contours of the illicit drug use problem among young Americans is a prerequisite for rational public debate and policymaking. In the absence of reliable *prevalence* data, substantial misconceptions can develop and resources may be misallocated. In the absence of reliable data on *trends*, the early detection and localization of emerging problems are more difficult and societal responses more lagged. We believe that Monitoring the Future played an important role in establishing that cigarette smoking among American adolescents was rising sharply in the 1990s, a fact which helped to encourage and buttress some very important policy initiatives. In addition, assessments of the impact of major historical and policy-induced events are much more conjectural without good trend data. Finally, the accurate empirical comparison of subgroup differences has challenged conventional wisdom in some important ways.

The Monitoring the Future study also monitors a number of factors that we believe help *explain* the changes observed in drug use. Many are discussed in this series of volumes. They include peer norms regarding drugs, beliefs about the dangers of drugs and perceived availability. In fact, monitoring these factors has made it possible to examine a central policy issue in this nation's war on drugs—namely, the relative importance of supply factors versus demand factors in bringing about some of the observed declines (and more recently, increases) in drug use. We also have developed a general theory of drug epidemics that makes use of many of these concepts to explain the rises and declines that occur in use.[4]

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[4]See Johnston, L. D. (1991). Toward a theory of drug epidemics. In R. L. Donohew, H. Sypher, & W. Bukoski (Eds.), *Persuasive communication and drug abuse prevention* (pp. 93-132). Hillsdale, NJ: Lawrence Erlbaum.

In addition to assessing prevalence and trends accurately, and trying to determine their causes, the Monitoring the Future study has quite a number of other important research objectives. Among these are 1) helping to determine which young people are at the greatest risk for developing various patterns of drug abuse; 2) gaining a better understanding of the lifestyles and value orientations associated with various patterns of drug use, and monitoring how subgroup differences and lifestyle orientations are shifting over time; 3) determining the immediate and more general aspects of the social environment associated with drug use and abuse; 4) determining how major transitions in social environment (entry into military service, civilian employment, college, homemaking, and unemployment) or in social roles (engagement, marriage, pregnancy, parenthood, divorce, and remarriage) affect drug use; 5) determining the life course of the various drug-using behaviors from early adolescence to middle adulthood and distinguishing such "age effects" from cohort and period effects in determining drug use; 6) evaluating possible explanations of period and age effects, including determining the effects of social legislation on various types of substance use; 7) examining possible consequences of using various drugs; and 8) determining the changing connotations of drug use and changing patterns of multiple drug use among youth.[5] We believe that the differentiation of period, age, and cohort effects in substance use of various types has been a particularly important contribution of the project; and it is one that the project's cohort-sequential research design is especially well suited to make. Readers interested in publications dealing with any of these other areas should write the authors at the Institute for Social Research, The University of Michigan, Ann Arbor, Michigan, 48106-1248.

WEB SITE

Up-to-date information about the study, and copies of the most recent press releases and selected reports from it, may be found on the Monitoring the Future Web site at: http://www.MonitoringTheFuture.org.

[5]For an elaboration and discussion of the full range of Monitoring the Future research objectives in the domain of substance abuse, see Johnston, L. D., O'Malley, P. M., Bachman, J. G., and Schulenberg, J. (1996). *Aims and objectives of the Monitoring the Future study and progress toward fulfilling them.* (Monitoring the Future Occasional Paper 34, Revised). Ann Arbor, MI: Institute for Social Research.

Chapter 2

OVERVIEW OF KEY FINDINGS

Over the past quarter century the Monitoring the Future study has tracked young Americans' use of an array of psychoactive substances, both illicit and licit. This annual series of monographs is written by the study's investigators and published by its sponsor—the National Institute on Drug Abuse; and it provides one of the major vehicles by which the epidemiological findings from the study are reported. The present two-volume monograph, which reports the study's findings through 1999, is the latest one in this long-term series. This year, for the first time, an advance report was published earlier in the year, providing a synopsis of the key findings from the 1999 survey of secondary school students.[6]

Over its twenty-five year existence, Monitoring the Future has conducted in-school surveys of nationally representative samples of (a) high school seniors each year since 1975 and (b) eighth- and tenth-grade students each year since 1991. In addition, beginning with the Class of 1976, follow-up surveys have been conducted by mail on representative subsamples of the respondents from each previously participating twelfth-grade class.

Volume I of this report presents findings on the prevalence and trends in drug use and related factors for secondary school students (eighth, tenth, and twelfth graders). Trend data are presented for varying time intervals, covering up to a 24-year interval in the case of the twelfth graders. Volume II presents the comparable results for young adult high school graduates 19-32 years old, as well as college students, specifically. For college students, a particularly important subset of the young adult population for which very little nationally representative trend data exist, we present detailed prevalence and trend results covering a 19-year interval (since 1980). This year, for the first time, we include in Volume II data on 35 and 40 year-old respondents who have been followed for 17 and 22 years, respectively, since their graduation from high school.

The high school dropout segment of these populations—about 15%-20% of an age group by the end of senior year—is of necessity omitted from the coverage, though this omission should have a negligible effect on the coverage of college students. Appendix A of Volume I discusses the likely impact of omitting dropouts from the sample coverage at twelfth grade. Very few students will have left school by eighth grade, of course, and relatively few by the end of tenth grade; thus the results of the school surveys at those levels should be generalizable to the great majority of the relevant age cohorts.

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[6] Johnston, L. D., O'Malley P. M., & Bachman, J. G. (2000). *Monitoring the Future national results on adolescent drug use: overview of key findings, 1999*. (NIH Publication No. 00-4690) Bethesda, MD: National Institute on Drug Abuse. (Also available on the Web at www.MonitoringTheFuture.org.)

A number of important findings have emerged for these five national populations—eighth-grade students, tenth-grade students, twelfth-grade students, college students, and all young adults through age 28 who are high school graduates. They have been summarized and integrated in this chapter so that the reader may quickly get an overview of the key results. Because so many populations, drugs, and prevalence intervals are discussed here, a single integrative set of tables (Table 2-1 through 2-3) showing the 1991-1999 trends for all drugs on all five populations is included in this chapter.

TRENDS IN ILLICIT DRUG USE

- Earlier in the decade we noted an increase in the use of a number of illicit drugs among secondary students and some important changes among the students in terms of certain key attitudes and beliefs related to drug use. In the volume reporting 1992 survey results, we noted the beginning of such reversals in both use and attitudes among eighth graders, the youngest respondents surveyed in this study, and also a reversal in attitudes among the twelfth graders. Specifically, the proportions seeing great risk in using drugs began to decline, as did the proportions saying they disapproved of use. As we predicted, those reversals indeed presaged "an end to the improvements in the drug situation that the nation may be taking for granted." The use of illicit drugs rose sharply in all three grade levels after 1992, as negative attitudes and beliefs about drug use continued to erode. This pattern continued for some years.

  In 1997, for the first time in 6 years, illicit drug use finally began to decline among eighth graders. Use of marijuana continued to rise among tenth and twelfth graders, although their use of a number of other drugs appears to have leveled off, and relevant attitudes and beliefs also began to reverse in many cases. In 1998, illicit drug use continued a gradual decline among eighth graders and started to decline at tenth and twelfth grades. In 1999, the decline continued for eighth graders while use leveled for tenth and twelfth graders. We are hopeful that the leveling in 1999 simply represents a pause in a longer-term decline, much as did the earlier leveling in 1985 in the midst of an ongoing decline.

- As illustrated below in discussion of specific drugs, the increase in use of many drugs during the 1990s among secondary school students, combined with fairly level rates of use among college students and young adults, has resulted in some unusual reversals in the usage rates by age. In the early years of the epidemic, illicit drug use rates clearly were higher in the college age group (and eventually the young adults) than they were among secondary school students. But by the late 1990s, the highest rates of active use (i.e., annual or 30-day prevalence) tended to be found in the late secondary school years. For example, in 1999, 30-day prevalence of using ***any illicit drug*** is highest in twelfth grade (26%), second highest in tenth

grade (22.1%), third highest among college students (21.6%), fourth highest among 19- to 28-year-olds (17%), and lowest among eighth graders (12%). When it comes to using ***any illicit drug other than marijuana*** in the past 30 days, the rank order is: twelfth grade (10.4%), tenth grade (8.6%), college students (6.4%), 19- to 28-year-olds (6.0%), and finally eighth graders (5.5%). As can be seen, usage rates among tenth and twelfth graders are considerably higher than among young adults, and even higher than the college-student segment of the young adult population.

- Until 1997, ***marijuana*** use rose sharply among secondary school students, and their use of a number of ***other illicit drugs*** rose more gradually. The increase in marijuana use also began to appear among American college students, no doubt due largely to "generational replacement," wherein earlier graduating high school class cohorts are replaced in the college population by more recent ones who were more drug experienced, even before they left high school. A resurgence in illicit drug use spreading *up* the age spectrum is a reversal of the way the epidemic spread several decades earlier. In the 1960s the epidemic began on the nation's college campuses, and then the behavior diffused downward in age to high school students and eventually to junior high school students. This time the increases began in middle schools and have radiated up the age spectrum.

  At present there still is rather little increase in illicit drug use in the young adult population, 19 to 28 years old, taken as a whole. In fact, from 1991 through 1999, their use of ***illicit drugs*** (taken as a class) has held remarkably stable at the same time that adolescent use rose. We think that generational replacement may well begin to boost the numbers for this group, as well. In fact, some of that appears to have happened among college students, whose significant rise in marijuana use in 1998 was preceded by a two-year rise in the use of two other classes of illicit drugs (MDMA and cocaine).

  These diverging trends across the different age groups show that changes during the 1990s reflect some cohort effects—lasting differences between class cohorts—rather than broad secular trends, which characterize all of the age groups covered by the study. Typically, use has moved in parallel across most age groups.

- A parallel finding occurred for ***cigarette*** smoking, as well, in that college students showed a sharp increase in smoking, beginning in 1995, no doubt reflecting a generational replacement effect. (Smoking had been rising among high school seniors since 1992.) This has been a more typical pattern of change for ***cigarettes***, however, since differences in cigarette smoking rates among class cohorts tend to remain through much or all of the life cycle and also tend to account for much of the change in use which

is observed at any given age. Now, smoking among American college students shows a continuing pattern of increase, even though smoking among younger age groups has started to turn downward.

- ***Marijuana*** use, which had been rising sharply in all three grades of secondary school during the 1990s, began to turn downward in 1997 among eighth graders and then did the same in 1998 among tenth and twelfth graders. Only the eighth graders showed a continuation of this decline in 1999, however. In the 1990s, the annual prevalence of marijuana use (i.e., the percent reporting any use during the prior twelve months) tripled among eighth graders (from 6% in 1991 to 18% in 1996), more than doubled among tenth graders (from 15% in 1992 to 35% in 1997), and grew by nearly three-quarters among twelfth graders (from 22% in 1992 to 39% in 1997). Among college students, however, the increase in marijuana use, presumably due to a "generational replacement effect," was much more gradual. Annual prevalence rose by about one-third from 27% in 1991 to 35% in 1999. Among young adults there was even less change, from 24% in 1991 to 28% in 1999.

  Daily marijuana use rose substantially among secondary school and college students between 1992 and 1999, but somewhat less so among young adults (see Table 2-3). Nearly one in seventeen (6.0%) twelfth graders are now current daily marijuana users. Still, this rate is far below the 10.7% peak figure reached in 1978. Daily use among eighth graders is considerably lower, at 1.4%, but is still at the highest level it has been since 1991, when eighth-grade data were first collected.

  The amount of risk associated with using marijuana fell during the earlier period of increased use and again during the more recent resurgence of use in the 1990s. Indeed, at tenth and twelfth grades, perceived risk began to decline a year *before* use began to rise in the upturn of the 1990s, making perceived risk a leading indicator of change in use. (The same may have happened in eighth grade, as well, but we do not have data starting early enough to check that possibility.) The decline in perceived risk halted after 1997 in eighth and tenth grade, and use began to decline a year or two later. Again, perceived risk was a leading indicator of change in use.

  Personal disapproval of marijuana use slipped considerably among eighth graders between 1991 and 1996, and among tenth and twelfth graders between 1992 and 1997. For example, the proportions of eighth, tenth, and twelfth graders who said they disapproved of trying marijuana once or twice fell by 17, 21, and 19 percentage points, respectively, over those intervals of decline. There has since been a little increase in disapproval among eighth and tenth graders but not yet among twelfth graders.

- Among seniors, the proportions using ***any illicit drug other than marijuana*** in the past year rose to 21% in 1997, from a low of 15% in 1992. (This recent peak in 1997 was substantially below the 34% peak rate in 1981.) By way of contrast, there was very little change for young adults on this measure after 1991 (see Table 2-2). All of the younger groups showed significant increases but not as large in proportional terms as was true for marijuana. Use of any illicit drug other than marijuana began to increase in 1992 among eighth graders, in 1993 among tenth and twelfth graders, and in 1995 among college students. Use peaked in 1996 among eighth and tenth graders, and by 1997 among twelfth graders, college students, and young adults. The younger ages have shown a slight decline since, and the older age groups a leveling.

- Between 1989 and 1992 we noted an increase among college students and young adults in the use of ***LSD***, a drug most popular in the late 1960s and early 1970s. In 1992, all five populations showed an increase in annual prevalence of LSD; for four subsequent years, modest increases persisted among the secondary school students. Use of LSD in all three grades leveled in 1997 and showed some (nonsignificant) decline in 1998. Use of LSD among college students and young adults peaked around 1995 and has declined some in both groups since then, though there was no further decline in 1999.

  Prior to the significant increase in LSD use among seniors in 1993, there was a significant 4.3 percentage point decline between 1991 and 1992 in the proportion seeing great risk associated with trying LSD. The decline in this belief, which continued through 1997, halted in 1998. The proportion of seniors disapproving of LSD use also began to decline in 1992, continued through 1996, and reversed in 1997.

  Because LSD was one of the earliest drugs to be popularly used in the overall American drug epidemic, there is a distinct possibility that young people—particularly the youngest cohorts, like the eighth graders—are not as concerned about the risks of use. They have had less opportunity to learn vicariously about the consequences of use by observing others around them, or to learn from intense media coverage of the issue, which occurred some years earlier. We were concerned that this type of "generational forgetting" of the dangers of a drug, which occurs as a result of generational replacement, could set the stage for a whole new epidemic of use. In fact, perceived harmfulness of LSD began to decline after 1991 among seniors. These measures for risk and disapproval were first introduced for eighth and tenth graders in 1993 and both measures had been dropping until 1997 or 1998, after which perceived risk and disapproval leveled.

- The use of prescription-controlled ***amphetamines***—one of the most widely used classes of drugs taken illicitly (i.e., outside of medical regimen)—increased by about half among eighth and tenth graders between 1991 and 1996 (though the usage levels were still well below those attained in the early 1980s). In 1997, use declined significantly among eighth graders and leveled among tenth graders, but use continued to increase among twelfth graders. After 1997, use continued to decline in eighth and tenth grade and leveled in twelfth grade.

  Between 1982 and 1992, annual prevalence rates for the use of amphetamines among seniors fell substantially, from 20% to 7%. Rates among college students fell over the same interval, from 21% to 4%. The subsequent increase in use of illicit amphetamines (and a decrease in disapproval) began among seniors in 1993, following a sharp drop in perceived risk a year earlier (which, as we have said, often serves as a leading indicator). Following a period of decline, disapproval and perceived risk associated with amphetamine use stabilized in 1997 among seniors, while use showed a leveling. In 1998, there was a sharp rise in perceived risk (up 4.3 percentage points). This general pattern of change is consistent with our theoretical position that perceived risk can drive both disapproval and use.

  College students showed a modest increase in amphetamine use during the 1990s, but the absolute prevalence rates are only about half those for tenth and twelfth graders; and use among young adults generally is lower still and has changed very little.

  Among the most widely reported specific amphetamines in recent years are ***Ritalin***™ (the use of which increased from an annual prevalence of 0.1% in 1992 to 2.8% in 1997, before leveling), ***ice*** (the use of which increased in the late 1990s but fell in 1999), and ***methamphetamine***. (See Table E-2 in Appendix E.)

- The ***inhalants*** constitute another class of abusable substances in which a troublesome increase (this time a longer-term one) was followed by a reversal among secondary school students—after 1995, in this instance. Inhalants are defined as fumes or gases that are inhaled to get high, and they include common household substances such as glues, aerosols, butane, and solvents. One class of inhalants, ***amyl and butyl nitrites***, became somewhat popular in the late 1970s, but their use has been almost eliminated. For example, their annual prevalence rate among twelfth-grade students was 6.5% in 1979 but only 0.9% in 1999.

  When the nitrites are removed from consideration, it appears that all inhalants taken together showed an upward trend in annual use until 1995. Largely prompted by reports of Monitoring the Future survey findings

regarding the rise in inhalant use, the Partnership for a Drug-Free America launched an anti-inhalant ad campaign in mid-April of 1995. By the 1996 spring survey of eighth and tenth graders (twelfth graders are not asked about the dangers of inhalants), there was a sharp increase (of 3 to 6 percentage points, depending on the measure) in the percent who said that using inhalants carries great risk to the user. Inhalant use in all grades began to decline in 1996 and has continued declining since, after a long and steady increase in the preceding years. This is all the more noteworthy because illicit drug use generally was still increasing in 1996 and (for the upper two grades) in 1997 as well.

Some 10% of the 1999 eighth graders and 7% of the tenth graders indicated inhalant use in the prior 12 months, making inhalants the second most widely used class of illicitly used drugs for eighth graders (after marijuana) and the third most widely used (after marijuana and amphetamines) for tenth graders. Inhalants can and do cause death, and tragically, this often occurs among those in their early teens. Because the use of inhalants decreases with age, this class of drugs shows an unusual pattern, with active use being highest among the eighth graders (10% annual prevalence in 1999) and lowest among the young adult population (annual prevalence of 2% in 1999).

- ***Crack cocaine*** use spread rapidly from the early to the mid-1980s. Still, among high school seniors, the overall prevalence of crack leveled in 1987 at a relatively low prevalence rate (3.9% annual prevalence), even though crack use still continued to spread to new communities. Annual prevalence dropped sharply in the next few years, reaching 1.5% by 1991, where it remained through 1993. Then it rose gradually to 2.7% by 1999.

  Among eighth and tenth graders, crack use has risen gradually in the 1990s: from 0.7% in 1991 to 2.1% by 1998 among eighth graders, and from 0.9% in 1992 to 2.5% in 1998 among tenth graders. In 1999 there was a significant decrease in use among eighth graders while use among tenth graders leveled. In contrast, among young adults one to ten years past high school, annual prevalence was 1.4% in 1999, virtually unchanged since 1992. Nor was there much change in the low rates of crack use among college students during the 1990s. Except for the recent decline among eighth graders, there does not yet seem to be a turnaround (as we have seen for most other drugs) in the crack situation, and perceived risk continued to decline in 1999 at all grade levels.

  Among seniors, annual crack prevalence among the college-bound is considerably lower than among those not bound for college (1.9% for college-bound versus 5.0% for noncollege-bound, in 1999).

We believe that the particularly intense and early media coverage of the hazards of crack cocaine likely had the effect of "capping" an epidemic early, by deterring many would-be users and by motivating many experimenters to desist use. When we first measured crack use in 1987, we found that it had the highest level of perceived risk of any of the illicit drugs. While 4.6% of seniors in 1999 reported ever having tried crack, only 1.1% reported use in the past month, indicating that 76% of those who tried crack did not establish a pattern of continued use.

In 1993, although crack use did not increase, the levels of perceived risk and disapproval associated with crack dropped in all three grade levels, predicting the rise in use in all three grades between 1994 and 1998. Because more than a decade has now passed since the media frenzy about crack use peaked in 1986, it is quite possible that "generational forgetting" of the risks of that drug has been occurring.

- ***Cocaine***[7] in general began to decline a year earlier than crack, probably because crack was still in the process of diffusing to new parts of the country since it was still quite new. Between 1986 and 1987 the annual prevalence rate for cocaine dropped dramatically, by roughly one-fifth in all three populations then studied—seniors, college students, and young adults. The decline occurred when young people began to view experimental and occasional use—the type of use in which they are most likely to engage—as more dangerous. This change first began to occur in 1987, probably partly because the hazards of cocaine use received extensive media coverage during the preceding year, but almost surely in part because of the highly-publicized cocaine-related deaths in 1986 of sports stars Len Bias and Don Rogers. By 1992, the annual prevalence of cocaine use had fallen by about two-thirds among the three populations for which long-term data are available (twelfth graders, college students, and young adults).

  In 1993, cocaine use remained stable among secondary students but continued to decline among college students and young adults through 1994. From 1994 through 1996, annual use continued to rise among eighth, tenth, and twelfth graders, and possibly started to rise among college students; however, it remained stable among young adults. All groups (except eighth graders, who showed a small decline in 1999) have exhibited some continued upward drift in overall cocaine use since 1996.

  Again, the story regarding attitudes and beliefs is informative. Having risen substantially since 1986, the perceived risk of using cocaine actually showed some (nonsignificant) decline in 1992 among seniors. In 1993, perceived risk for cocaine other than crack fell sharply in all grades and

[7] Unless otherwise specified, all references to "cocaine" refer to the use of cocaine in any form, including crack.

disapproval began to decline in all grades, though not as sharply as perceived risk. Perceived risk declined until 1995 for eighth and twelfth graders and until 1998 for tenth graders. It increased some for all three grades in 1999. Disapproval declined between 1991 and 1995 among eighth graders, before leveling, and in 1992 through 1998 among tenth and twelfth graders, with the exception of an increase for twelfth graders in 1995. These changes foretold a subsequent leveling of use at each grade level.

Through 1989, there was no decline in perceived availability of cocaine among twelfth graders; in fact, it rose steadily from 1983 to 1989, suggesting that availability played no role in bringing about the substantial downturn in use after 1986. After 1989, however, perceived availability fell some among seniors; the decline may be explained by the greatly reduced proportions of seniors who said they have any friends who use, because friendship circles are an important part of the supply system. Since 1992 there has been rather little change in eighth and tenth grade reports of availability of powder cocaine. Among seniors, reported availability declined from 1992 to 1994, before leveling.

As with all the illicit drugs, lifetime cocaine prevalence climbs with age, reaching 25% by age 32 (among the 1999 survey respondents). Unlike all of the other illicit drugs, active use of cocaine—i.e., annual prevalence or monthly prevalence—holds fairly steady after high school (and until recent years increased in use after high school) rather than declining.

- ***PCP*** use fell sharply among high school seniors between 1979 and 1982, from an annual prevalence of 7.0% to 2.2%. It reached a low point of 1.2% in 1988, rose some in the 1990s to 2.6% in 1996, then declined to 1.8% by 1999. For the young adults, the annual prevalence rate is now only 0.6% (although this is the highest rate it has reached in the 1990s).

- Looking at the long-term trends, we see that the annual prevalence of ***heroin*** use among twelfth graders fell by half between 1975 (1.0%) and 1979 (0.5%). It then stabilized for fifteen years until 1994 (0.6%), before rising significantly to 1.1% in 1995, where it leveled. There has been little change since then (1.1% in 1999). Among young adults and college students, heroin statistics also were quite stable at low rates (about 0.1% to 0.2%) through 1994, followed by an increase in 1995 and then a leveling.

  Shorter-term trends for eighth and tenth graders show an increase in heroin use from 1993 through 1996. Then, eighth graders' use of heroin decreased significantly to 1.3% in 1997, where it stayed, while tenth graders' use leveled after 1997. Their annual prevalence rates are roughly double what they were in the early 1990s. Two factors very likely contributed to the upturn in heroin use in the 1990s. One is that there was

a long-term decline in the perceived risk of harm from heroin use, probably due to "generational forgetting." The second factor is that in recent years the increased purity of heroin allowed it to be used by means other than injection. This may have lowered an important psychological barrier for some potential users by making heroin use less aversive, and by making it seem less addictive as well as safer because non-injection reduces the likelihood of transmission of HIV, hepatitis, or other serious diseases. Using some new questions on heroin use introduced in 1995, we were able to show that significant proportions of past-year users in grades eight, ten, and twelve, have indeed been taking heroin by means other than injection. (See Chapter 4 for details.)

The risk perceived to be associated with heroin fell for more than a decade after the study began, with 60% of the 1975 seniors seeing a great risk of trying heroin once or twice and only 46% of the 1986 seniors saying the same. Between 1986 and 1991 perceived risk rose some, from 46% to 55%, undoubtedly reflecting the newly recognized threat of HIV infection associated with heroin injection. After 1991, however, perceived risk fell again (to 51% by 1995), this time perhaps reflecting the fact that the newer heroin available on the street could be administered by methods other than injection because it was so much purer. In 1996, perceived risk among seniors began to rise once again, and then rose sharply by 1997 and continued to rise in 1998—this time perhaps as the result of an anti-heroin campaign launched by the Partnership for a Drug-Free America in June 1996, as well as the visibility of heroin-related deaths of some celebrities in the entertainment and fashion design worlds.

Questions about the degree of risk perceived to be associated with heroin use were first introduced into the questionnaires for eighth and tenth graders in 1995. The questions asked specifically about use "without using a needle," because we thought this was the form of heroin use of greatest concern at that point. (Similar questions were asked of twelfth graders, as well, in one of the six questionnaire forms.) In general, perceived risk in all three grades rose in 1996 and 1997, before leveling.

- The use of ***narcotics other than heroin*** had been fairly level over most of the life of the study. Seniors had an annual prevalence rate of 4% to 6% from 1975 to 1990. In 1991, however, a significant decline (from 4.5% to 3.5%) was observed. Use stayed at this level for a few years, before increasing significantly from 3.6% in 1993 to 6.7% by 1999. Young adults in their twenties generally showed a very gradual decline from 3.1% in 1986 to 2.2% in 1993; college students likewise showed a slow decrease, from 3.8% between 1982 and 1984 to 2.5% in 1993. Over the last five years, however, the young adults have shown a modest increase, to 3.8% in 1999, as have the college students (to 4.3% in 1999). (Data are not reported for eighth and tenth graders because we believe younger

students are not accurately discriminating among the drugs that should be included or excluded from this general class.) The specific drugs in this class are listed in Table E-4 in Appendix E, which shows that codeine and opium are among the ones most commonly mentioned in recent years.

- A long, substantial decline, which began in 1977, occurred for ***tranquilizer*** use among high school seniors. By 1992, annual prevalence reached 2.8%, down from 11% in 1977. Since 1992, use increased significantly (as has been true with most of the drugs), reaching 5.8% in 1999. Reported tranquilizer use also exhibited some recent, modest increase among eighth graders, from 1.8% in 1991 to 3.3% in 1996, before declining to 2.6% in 1998. Among tenth graders, annual prevalence remained stable between 1991 and 1994, at around 3.3%, increased significantly to 4.6% by 1996 and then leveled. After a period of stability, college students also showed some increase between 1994 and 1998. For the young adult sample, annual prevalence increased significantly in 1998, after a long period of decline. Most of the reported tranquilizer use in recent years has involved taking Valium™. (See Table E-3 in Appendix E.)

- The long-term gradual decline in ***barbiturate*** use, which began at least as early as 1975, when the study began, halted in 1988. Annual prevalence among seniors had fallen by more than two-thirds, from 10.7% in 1975 to 3.2% in 1988. It then hovered around 3.4% through 1991 before dropping further to 2.8% by 1992. Use then rose steadily to 5.8% in 1999—still only about half of the rate in the peak year. The 1999 annual prevalence of this class of sedative drugs is lower among young adults (2.8%) and college students (3.2%) than among seniors (5.8%). Use among college students began to rise a couple of years later than it did among twelfth graders, no doubt reflecting the impact of generational replacement. Use has increased only slightly so far among young adults. (Data are not included here for eighth and tenth grades, because we believe the younger students have more problems with the proper classification of the relevant drugs.)

- ***Methaqualone***, another sedative drug, has shown quite a different trend pattern than barbiturates. Its use rose among seniors from 1975 to 1981, when annual prevalence reached 8%. Its use then fell very sharply, declining to 0.2% by 1993, before rising significantly during the general drug resurgence in the 1990s, to 1.1% by 1996, where it has leveled. Use also fell among all young adults and among college students, who had annual prevalence rates of only 0.3% and 0.2%, respectively, by 1989—the last year they were asked about this drug. In the late 1980s, shrinking availability may well have played a role in this drop, as legal manufacture and distribution of the drug ceased. Because of its very low usage rates, only the seniors are now asked about use of this drug.

- Questions about the use of ***MDMA (ecstasy)*** have been included in the follow-up surveys of college students and young adults since 1991; however, because of our concern about stimulating interest in an attractive-sounding and little-known drug, these questions were not added to the secondary school surveys until 1996. From 1991 to 1994, the annual prevalence rates tended to be quite low in the older age groups for whom we had data, but in 1995 there was a substantial increase (from 0.5% to 2.4% among college students, and from 0.7% to 1.6% among young adults).

  When data were first gathered on secondary school students in 1996, the tenth and twelfth graders showed higher rates of annual use (both 4.6%) than the college students (2.8%). Ecstasy use then fell steadily at all three grades between 1996 and 1998 (though it continued to rise among college students and young adults through 1999). In 1999 there was a significant jump in use among both the tenth and twelfth graders—one which we found to be concentrated primarily in the Northeast and in large cities. Thus, this "club drug" made a clear comeback among teens in one region in 1999, and it is possible that its popularity will spread more widely next year.

- In sum, five classes of illicitly used drugs, ***marijuana***, ***cocaine***, ***amphetamines***, ***LSD***, and ***inhalants*** have had an impact on appreciable proportions of young Americans in their late teens and twenties. In 1999, high school seniors showed annual prevalence rates of 38%, 6%, 10%, 8%, and 6%, respectively, all unchanged from 1998. Among college students in 1999, the comparable annual prevalence rates are 35%, 5%, 6%, 5%, and 3%; and for all high school graduates one to ten years past high school (young adults) the rates are 28%, 5%, 5%, 4%, and 2%. Joining this set of long-established drugs in 1999 as among the more prevalent is ***MDMA (ecstasy)***, which has annual prevalence rates of nearly 6% among twelfth graders and college students and nearly 4% among young adults.

  It is worth noting that LSD has climbed in the rankings because its use has not declined, and in some cases has increased, during a period in which use of cocaine, amphetamines, and other drugs declined appreciably.

  For similar reasons the inhalants have become relatively more important for the younger segments of the population. In fact, in eighth grade, inhalants are second to marijuana as the most widely used of the illicit drugs.

  Because of their importance among the younger adolescents, a new index of illicit drug use including inhalants was introduced in Table 2-1 through 2-2 in recent years. Certainly the use of inhalants reflects a form of illicit,

psychoactive drug use; its inclusion makes relatively little difference in the illicit drug index prevalence rates for the older age groups, but considerable difference for the younger ones. For example, in 1999 the proportion of eighth graders reporting any illicit drug use in their lifetime, exclusive of inhalants, was 28%, whereas including inhalants raised the figure to 37%.

- The annual prevalence among twelfth graders of over-the-counter ***stay-awake pills***, which usually contain caffeine as their active ingredient, nearly doubled between 1982 and 1990, increasing from 12% to 23%. After 1990 this statistic fell to 19% in 1998, and then to 16% in 1999. Earlier decreases also occurred among the college-aged young adult population (ages 19 to 22), in which annual prevalence was 26% in 1989, declined to 19% in 1998, and then to 16% in 1999—its lowest level since 1986.

  The ***look-alikes*** also have shown some falloff in recent years. Among high school seniors, annual prevalence decreased slightly from 6.8% in 1995 to 5.0% in 1999; among young adults aged 19 to 22, the corresponding figures are 6.0% and 4.0%. Over-the-counter ***diet pills*** have not shown a recent decline. Among high schools seniors, annual prevalence declined from 1986 to 1995, from 15% to 10%, where it still stands in 1999. (Among twelfth-grade girls in 1999, some 27% had tried diet pills by the end of senior year, 16% used them in the past year, and 5% used them in just the past 30 days.) Among young adults aged 19 to 22 there also had been an earlier decline from 1986 to 1995, with annual prevalence going from 17% to 6.9%; by 1998, however, it had risen slightly, to 8.6% before climbing to 11.4% in 1999.

College-Noncollege Differences in Illicit Drug Use

- American college students (defined here as those respondents one to four years past high school who were actively enrolled full-time in a two- or four-year college) show annual usage rates for several categories of drugs which are about average for all high school graduates their age; these categories include ***any illicit drug***, ***marijuana***, ***inhalants***, ***hallucinogens other than LSD***, and ***narcotics other than heroin***. For several other categories of drugs, however, college students have rates of use that are below those of their age peers, including ***any illicit drug other than marijuana***, ***hallucinogens***, ***LSD*** specifically, ***cocaine***, ***crack cocaine*** specifically, ***heroin***, ***amphetamines***, ***ice***, ***barbiturates*** and ***tranquilizers***. Their use of hallucinogens other than LSD is slightly higher than it is among their noncollege peers in 1999.

  Because college-bound seniors had below average rates of use on all of these illicit drugs while they were in high school, the eventual attainment

of parity on many of them reflects some closure of the gap. As results from the study published elsewhere have shown, this college effect of "catching up" is largely explainable in terms of differential rates of leaving the parental home after high school graduation, and of getting married. College students are more likely than their age peers to have left the parental home and its constraining influences and less likely to have entered marriage, with its constraining influences.[8]

- In general, the trends since 1980 in illicit substance use among American college students have paralleled those of their age peers not in college. Most drugs showed a period of substantial decline in use sometime after 1980. Further, all young adult high school graduates through age 28, as well as college students taken separately, showed trends highly parallel for the most part to the trends among high school seniors until about 1992. After 1992, a number of drugs showed an increase in use among seniors (as well as eighth and tenth graders), but not among college students and young adults.

  This divergence, combined with the fact that the upturn began first among the eighth graders (in 1992), suggests that cohort effects are emerging for illicit drug use. In fact, as those heavier-using cohorts of high school seniors enter the college years, we are beginning to see a lagged increase in the use of several drugs in college. For example, annual prevalence reached a low point among twelfth graders in 1992 for a number of drugs (e.g. ***cocaine, amphetamines, barbiturates, tranquilizers, other narcotics,*** *and* ***any illicit drug other than marijuana***) before rising thereafter; among college students, those same drugs reached a low two years later in 1994, and then began to rise gradually. Then, in 1998, as ***marijuana*** use was declining in the three grades of secondary school, we saw a sharp increase among college students. The evidence for cohort effects resulting from generational replacement is impressive and consistent with our earlier predictions.

Male-Female Differences in Illicit Drug Use

- Regarding gender differences in three older populations (seniors, college students, and young adults), males are more likely to use *most illicit drugs*, and the differences tend to be largest at the higher frequency levels. ***Daily marijuana use*** among high school seniors in 1999, for example, is reported by 7.9% of males versus 3.9% of females; among all adults (aged 19 to 32 years) by 5.5% of males versus 2.6% of females; and among college students, specifically, by 5.9% of males versus 2.7% of females.

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[8] Bachman, J. G., Wadsworth, K. N., O'Malley, P. M., Johnston, L. D., & Schulenberg, J. (1997). *Smoking, drinking, and drug use in young adulthood: The impacts of new freedoms and new responsibilities*. Mahwah, NJ: Lawrence Erlbaum Associates.

- In the eighth and tenth grade samples there are fewer gender differences in the use of drugs—perhaps because girls tend to date and then emulate older boys, who are in age groups considerably more likely to use drugs. There is little male-female difference in eighth and tenth grades in the use of ***cocaine*** and ***crack***. ***Amphetamine*** use is slightly higher among females.

TRENDS IN ALCOHOL USE

- Several findings about ***alcohol*** use in these age groups are noteworthy. First, despite the fact that it is illegal for virtually all secondary school students and most college students to purchase alcoholic beverages, experience with alcohol is almost universal among them. That is, alcohol has been tried by 52% of eighth graders, 71% of tenth graders, 80% of twelfth graders, and 88% of college students; and active use is widespread. Most important, perhaps, is the widespread occurrence of ***occasions of heavy drinking***—measured by the percent reporting five or more drinks in a row at least once in the prior two-week period. Among eighth graders this statistic stands at 15%, among tenth graders at 26%, among twelfth graders at 31%, and among college students at 40%. After the early twenties this behavior recedes somewhat with age, reflected by the 33% rate found in the entire young adult sample and the 24% rate found among 31- to 32-year-olds.

- Alcohol use did not increase as use of other illicit drugs decreased among seniors from the late 1970s to the early 1990s, although it was common to hear such a "displacement hypothesis" asserted. This study demonstrates that the opposite seems to be true. After 1980, when illicit drug use was declining, the monthly prevalence of alcohol use among seniors also declined gradually, but substantially, from 72% in 1980 to 51% in 1993. ***Daily alcohol use*** declined from a peak of 6.9% in 1979 to 2.5% in 1993; and the prevalence of drinking ***five or more drinks in a row*** during the prior two-week interval fell from 41% in 1983 to 28% in 1993—nearly a one-third decline. When illicit drug use rose again in the 1990s, there was evidence that alcohol use (particularly binge drinking) was rising some as well—albeit not nearly as sharply as did marijuana use. In the late 1990s, as illicit drug use leveled in secondary schools and began a gradual decline, similar trends are observed for alcohol.

Male-Female Differences in Alcohol Use

- There is a substantial gender difference among high school seniors in the prevalence of ***occasions of heavy drinking*** (24% for females versus 38% for males in 1999); this difference generally had been diminishing very

gradually since the study began. (In 1975 there was a 23 percentage point difference between them, versus a 15 point difference in 1999.)

- As just discussed, there also are substantial gender differences in alcohol use among college students, and young adults generally, with males drinking more. For example, 50% of college males report having ***five or more drinks in a row*** over the previous two weeks versus 34% of college females. There has not been a great deal of change in this gender difference since 1980.

College-Noncollege Differences in Alcohol Use

- The data from college students show a quite different pattern of change in relation to alcohol use than that of twelfth graders or noncollege respondents of the same age. (See Figure 9-13 in Volume II). From 1980 to 1993, college students showed less drop-off in monthly prevalence of ***alcohol*** use (82% to 70%) than did high school seniors (72% to 51%) and slightly less decline in daily prevalence (6.5% to 3.9%) compared to a decline from 6.0% to 2.5% among high school seniors. ***Occasions of heavy drinking*** also declined less among college students from 1980 to 1993, from 44% to 40%, compared to a decline from 41% to 28% among high school seniors. Among noncollege-aged peers, the decline was from 41% to 34%. Thus, because both their noncollege-aged peers and high school students were showing greater declines, the college students stood out as having maintained a high rate of binge or party drinking. Between 1993 and 1999, the college students changed little (40% in 1999—the same rate observed in 1993), while their noncollege-aged peers increased by 1 percentage point, to 35%; high school seniors increased by 3 percentage points, to 31%. Still, college students stand out as having a relatively high rate of binge or party drinking.

  Because the college-bound seniors in high school are consistently less likely to report occasions of heavy drinking than the noncollege-bound, the higher rates of such drinking in college indicate that they "catch up to and pass" their peers in binge drinking after high school graduation.

- Since 1980, college students have generally had ***daily drinking*** rates that were slightly lower than their age peers, suggesting that they were more likely to confine their drinking to weekends, when they tend to drink a lot. College men have much higher rates of daily drinking than college women (6.1% versus 3.4% in 1999). This gender difference is also reflected in the noncollege group (8.1% versus 3.6%, respectively).

- The rate of daily drinking fell considerably among the noncollege group, from 8.3% in 1980 to 3.2% in 1994, but is now back to 5.5%. Daily

drinking by the college group went from 6.5% to 3.0% in 1995, and stands at 4.5% in 1999.

- In 1999, college males had a somewhat higher binge drinking rate (50%) than noncollege males the same age (44%).

TRENDS IN CIGARETTE SMOKING

- Quite a number of very important findings about ***cigarette smoking*** among American adolescents and young adults have emerged during the life of the study. Despite the demonstrated health risks associated with smoking, sizeable and, in recent years, growing proportions of young people continued to establish regular cigarette habits during late adolescence. In fact, since the study began in 1975, cigarettes have consistently comprised the class of abusable substance most frequently used on a daily basis by high school students.

- During most of the 1980s, when smoking rates were falling steadily among adults, we reported that smoking among adolescents was not declining. Then, the situation went from bad to worse.

- Among eighth and tenth graders, the current smoking rate increased by about half between 1991 (when their use was first measured) and 1996; and among twelfth graders, the current smoking rate rose by nearly one-third between 1992 (their recent low point) and 1997. This study played an important role in bringing these increases to public attention.

  Fortunately, there has been some decline in current smoking since 1996 in the case of eighth and tenth graders, and since 1997 in the case of twelfth graders (nonsignificant for twelfth graders). In 1999, 18% of eighth graders, 26% of tenth graders, and 35% of twelfth graders reported smoking one or more cigarettes in the prior 30 days. Thus, at present over a third of American young people are current smokers by the time they complete high school; and other research consistently shows that smoking rates are substantially higher among those who drop out before graduating.

  Daily smoking rates also increased by about half among eighth graders (from a low of 7.0% in 1992 to 10.4% in 1996) and tenth graders (from a low of 12.3% in 1992 to 18.3% in 1996), while daily smoking among twelfth graders increased by 43% (from a low of 17.2% in 1992 to 24.6% in 1997). In 1997, we saw the first evidence of a change in the situation, as daily smoking rates declined among eighth graders and leveled among tenth graders. There was a significant decline in tenth and twelfth graders' daily smoking rates by 1998.

- For seniors, the upturn in the 1990s followed a substantial decline in smoking during a much earlier period (from 1977 to 1981), a leveling for nearly a decade (through 1990), and a slight decline in 1991 and 1992. Rates then started up, and the 1998 decline in daily smoking rates was the first decline in use by seniors since 1992.

- The dangers perceived to be associated with ***pack-a-day*** smoking differ greatly by grade level and seem to be unrealistically low at all grade levels. Currently, only between two-thirds and three-quarters of the seniors (71%) report that pack-a-day smokers run a great risk of harming themselves physically or in other ways: more importantly, only about half (55%) of the eighth graders say the same. All three grades showed a decrease in perceived risk between 1993 and 1995, as use was rising rapidly, but a slightly larger and offsetting increase between 1995 and 1999, presaging the turnaround in smoking.

  Disapproval of cigarette smoking had been in decline longer: from 1991 through 1996 among eighth and tenth graders, and from 1992 to 1996 among twelfth graders. Since then there has been an increase in disapproval in all three grades, though it is not yet large enough to offset the earlier decline completely. Undoubtedly the heavy media coverage of the tobacco issue (the proposed settlement with the state attorneys general, the congressional debate, the eventual state settlements, etc.) had an important influence on these attitudes. However, that coverage diminished considerably in 1998, raising the question of whether these changes in youth attitudes will continue. It may well be, of course, that the removal of certain kinds of cigarette advertising and promotion, combined with national and state-level anti-smoking campaigns, will sustain these changes.

Age and Cohort-Related Differences in Cigarette Smoking

- Initiation of smoking most often occurs in grades 6 through 9 (i.e., at modal ages 11-12 to 14-15), with rather little further initiation after high school, although a number of light smokers make the transition to heavy smoking in the first two years after high school. Analyses presented in this volume and elsewhere have shown that cigarette smoking shows a clear "cohort effect." That is, if a class (or birth) cohort establishes an unusually high rate of smoking at an early age relative to other cohorts, the rate is likely to remain high throughout the life cycle relative to that of other birth cohorts at equivalent ages.

- As we reported in the "Other Findings from the Study" chapter in the 1986 volume in this series, some 53% of the half-pack-a-day (or more) smokers in senior year said that they had tried to quit smoking and found they could not. Of those who had been daily smokers in twelfth grade, nearly

three-quarters were daily smokers seven to nine years later (based on the 1985 follow-up survey), despite the fact that in high school only 5% of them thought they would "definitely" be smoking five years hence. A more recent analysis, based on the 1995 follow-up survey, showed similar results. Nearly two-thirds (63%) of those who had been daily smokers in the twelfth grade still were daily smokers seven to nine years later, although in high school only 3% of them had thought they would "definitely" be smoking five years hence. Clearly, the smoking habit is established at an early age; it is difficult to break for those young people who have it; and young people greatly overrate their own ability to quit. Additional data from the eighth and tenth grade students show us that younger children are even more likely than older ones to underestimate seriously the dangers of smoking.

- The surveys of eighth and tenth graders also show that cigarettes are almost universally available to teens. Nearly three-quarters (72%) of eighth graders and nearly nine-tenths (88%) of tenth graders say that cigarettes are "fairly easy" or "very easy" for them to get, if they want them. Until 1997 there had been little change in reported availability since these questions were first asked in 1992. Over the last three years, however, perceived availability of cigarettes decreased significantly for eighth and tenth graders, quite likely reflecting the impact of new regulations and related enforcement efforts aimed at reducing the sale of cigarettes to children.

College-Noncollege Differences in Cigarette Smoking

- A striking difference in smoking rates has long existed between college-bound and noncollege-bound high school seniors. For example, in 1999 smoking a half-pack or more per day is nearly two and one-half times as prevalent among the noncollege-bound seniors (23% versus 10%). Among respondents of college age (one to four years past high school), those not in college show the same dramatically higher rate of smoking compared to that found among those who are in college, with half-pack-a-day smoking standing at 23% and 11%, respectively.

- In the first half of the 1990s, smoking rose some among college students and their same-age peers, although the increases were not as steep for either group as they were among high school seniors. But in 1998 and 1999, while smoking was declining among secondary school students at all grades, smoking increased significantly for college students, no doubt reflecting the cohort effect from earlier, heavier-smoking classes of high school seniors moving into the older age groups. Between 1991 and 1999, the 30-day prevalence of cigarette smoking rose from 23% to 31%, or by about one-third, and daily smoking rose from 14% to 19%—or by about 40%.

Male-Female Differences in Cigarette Smoking

- In the 1970s, high school senior females caught up to, and passed, senior males in their rates of ***current smoking***. Both genders then showed a decline in use followed by a long, fairly level period, with use by females consistently higher, but with the gender difference diminishing. In the early 1990s there was another crossover—rates rose among males and declined among females. Both genders showed increasing use between 1992 and 1997 and some decline in use since.

  Among college students, females had slightly higher probabilities of being daily smokers from 1980 through 1994—although this long-standing gender difference was not true among their age peers not in college. However, there was a crossover in 1995—no doubt an echo of the crossover among seniors in 1991—and since 1995, smoking rates among college males have tended to be slightly higher than among females.

RACIAL/ETHNIC COMPARISONS

The three largest ethnic groupings—Whites, African Americans, and Hispanics taken as a group—are examined here. (Sample size limitations simply do not allow finer subgroup breakdowns unless many years are combined.) A number of interesting findings emerge in these comparisons, and the reader is referred to Chapters 4 and 5 of Volume I for a full discussion of them.

- African American seniors have consistently shown lower usage rates on most drugs, licit and illicit, than White seniors; this also is true at the lower grade levels where little dropping out of school has yet occurred. In some cases, the differences are quite large.

- African American students have a much lower prevalence of ***daily cigarette smoking*** than White students (8% versus 27% in senior year, in 1999) because their smoking rate continued to decline after 1983, while the rate for White students stabilized for some years. (Smoking rates had been rising among White seniors after 1992 and among African American seniors after 1994, but by 1998 there was evidence of a leveling or reversal in both groups in the lower grades.)

- In twelfth grade, ***occasions of heavy drinking*** are much less likely to be reported by African American students (12%) than by White students (36%) or Hispanic students (29%).

- In twelfth grade, of the three racial/ethnic groups, Whites have the highest rates of use on a number of drugs, including ***marijuana, inhalants, hallucinogens, LSD*** specifically, ***heroin, amphetamines, barbiturates,***

tranquilizers, narcotics other than heroin, alcohol, cigarettes, and ***smokeless tobacco.***

- However, in senior year, Hispanics have the highest usage rate for a number of the most dangerous drugs, e.g., ***cocaine*** and ***crack***. Further, in eighth grade, Hispanics have the highest rates not only on these drugs, but on many of the others, as well. For example, in eighth grade, the annual prevalence of ***marijuana*** for Hispanics is 23%, versus 15% for Whites and 16% for African Americans; for ***binge drinking***, 21%, 14%, and 10%, respectively. In other words, Hispanics have the highest rates of use for many drugs in eighth grade, but not in twelfth, which suggests that their considerably higher dropout rate (compared to Whites and African Americans) may change their relative ranking by twelfth grade.

- With regard to trends, seniors in all three racial/ethnic groups exhibited the decline in ***cocaine*** use from 1986 through 1992, although the decline was less steep among African American seniors because their earlier increase in use was not as large as the increase among White and Hispanic students.

- For virtually ***all of the illicit drugs***, the three groups have tended to trend in parallel. Because White seniors had achieved the highest level of use on a number of drugs—including ***amphetamines, barbiturates,*** and ***tranquilizers***—they also had the largest declines; African Americans have had the lowest rates, and therefore, the smallest declines.

- The important racial/ethnic differences in ***cigarette smoking*** noted earlier among seniors have emerged during the life of the study. The three groups were fairly similar in their smoking rates during the late 1970s, and all three mirrored the general decline in smoking from 1977 through 1981. From 1981 through 1992, however, smoking rates declined very little, if at all, for Whites and Hispanics, but the rates for African Americans continued to decline steadily. As a result, by 1992 the daily smoking rate for African Americans was one-fifth that for Whites. Subsequently, all three ethnic groups of twelfth graders exhibited fairly parallel trends in smoking.

DRUG USE IN EIGHTH GRADE

It may be useful to focus specifically on the youngest age group in the study—the eighth graders, most of whom are 13 or 14 years old—because the exceptional levels of both licit and illicit drug use that they already have attained help illustrate the nation's urgent need to continue to address the substance abuse problems among its young.

- By eighth grade 52% of youngsters report having tried ***alcohol*** (more than just a few sips) and a quarter (25%) say they have already been drunk at least once.

- Nearly half of the eighth graders (44%) have tried ***cigarettes***, and nearly one in five (18%) say they have smoked in the prior month. Shocking to most adults is the fact that only 55% of eighth graders recognize great risk associated with being a pack-a-day smoker.

- ***Smokeless tobacco*** has been tried by 21% of male eighth graders, is used currently by 7% of them, and is used daily by 1.6%. (Rates are far lower among females than among males.)

- Among eighth graders, one in five (20%) have used ***inhalants***, and one in twenty (5%) said they have used them in the past month. This is the only class of drugs for which use is substantially higher in eighth grade than in tenth or twelfth grade.

- ***Marijuana*** has been tried by more than one in every five eighth graders (22%), and has been used in the prior month by one in every ten (10%).

- A surprisingly large number of eighth-grade students (11%) say they have tried prescription-type ***amphetamines***; 3.4% say they have used them in the prior 30 days.

- Relatively few eighth graders say they have tried most of the other illicit drugs yet. (This is consistent with the retrospective reports from seniors.) But the proportions having at least some experience with them is not inconsequential when considering the fact that a 3.3% prevalence rate, for example, on average represents one child in every 30-student classroom. The 1999 eighth-grade proportions reporting experience with illicit drugs are ***tranquilizers*** (4.4%), ***LSD*** (4.1%), ***other hallucinogens*** (2.4%), ***crack*** (3.1%), ***other cocaine*** (3.8%), ***heroin*** (2.3%), and ***steroids*** (2.7% overall, and 3.9% among males).

- Overall, 16% of all eighth graders in 1999—one in every six—have tried ***some illicit drug other than marijuana*** (excluding inhalants).

- The very large number who have already begun use of the so-called "gateway drugs" (***tobacco***, ***alcohol***, ***inhalants***, and ***marijuana***) suggests that a substantial number of eighth-grade students are already at risk of proceeding further to such drugs as LSD, cocaine, amphetamines, and heroin.

SUMMARY AND CONCLUSIONS

We can summarize the findings on trends as follows: over more than a decade—from the late 1970s to the early 1990s—there were very appreciable declines in use of several ***illicit drugs*** among twelfth-grade students, and even larger declines in their use among American college students and young adults. These substantial improvements—which seem largely explainable in terms of changes in attitudes about drug use, beliefs about the risks of drug use, and peer norms against drug use—have some extremely important policy implications. One is that these various substance-using behaviors among American young people are malleable—they *can* be changed. It has been done before. The second is that demand-side factors appear to have been pivotal in bringing about those changes. The reported levels of availability of marijuana, as reported by high school seniors, has held fairly steady throughout the life of the study. (Moreover, both abstainers and quitters rank availability and price very low on their list of reasons for not using.) And, in fact, the perceived availability of cocaine actually was rising during the beginning of the sharp decline in cocaine and crack use.

However, improvements are not inevitable; and, when they occur, they should not be taken for granted because relapse is always possible. Indeed, just such a "relapse" in the longer-term epidemic occurred in the early to mid-1990s.

In 1992, eighth graders exhibited a significant increase in annual use of ***marijuana, cocaine, LSD***, and ***hallucinogens other than LSD***, as well as an increase in ***inhalant*** use. (In fact, all five populations showed some increase in ***LSD*** use, continuing a longer-term trend for college students and young adults.) Further, the attitudes and beliefs of seniors regarding drug use began to soften.

In 1993, use of a number of drugs began to rise among tenth and twelfth graders, as well, fulfilling our earlier predictions that we had made based on their eroding beliefs about the dangers of drugs and their attitudes about drug use. Increases occurred in a number of the so-called "gateway drugs"—***marijuana***, ***cigarettes***, and ***inhalants***—increases that we argued boded ill for the use of later drugs in the usual sequence of drug-use involvement. Indeed, the proportion of students reporting the use of ***any illicit drug other than marijuana*** rose steadily after 1991 among eighth and tenth graders and after 1992 among twelfth graders. (This proportion increased by more than half among eighth graders with annual prevalence rising from 8.4% in 1991 to 13.1% in 1996.) The softening attitudes about ***crack*** and other forms of ***cocaine*** also provided a basis for concern—the use of both increased fairly steadily through 1998.

Over the years, this study has demonstrated that changes in perceived risk and disapproval have been important causes of change in the use of several drugs. These beliefs and attitudes surely are influenced by the amount and nature of public attention paid to the drug issue in the historical period during which young people are growing up. A substantial decline in attention to this issue in the early 1990s very likely helps to explain why the increases in perceived risk and disapproval among students ceased and began to backslide. News coverage of the drug issue plummeted between 1989 and 1993

(although it made a considerable comeback as surveys—including this one—began to document that the problem was worsening again), and the media's *pro bono* placement of ads from the Partnership for a Drug-Free America also fell considerably. (The twelfth graders in this study showed a steady decline in their recalled exposure to such ads and in the judged impact of such ads on their own drug-taking behavior.)

Also, the deterioration in the drug abuse situation first began among our youngest cohorts—perhaps because they had not had the same opportunities for vicarious learning from the adverse drug experiences of people around them and people they learn about through the media. Clearly there was a danger that, as the drug epidemic subsided in the 1980s and early 1990s, newer cohorts would have far less opportunity to learn through informal means about the dangers of drugs—that what we have called a "generational forgetting" of those risks would occur through a process of generational replacement of older, more drug-savvy cohorts with newer, more naive ones. If true, this suggests that as drug use subsides, as it did by the early 1990s, the nation must redouble its efforts to ensure that such naive cohorts learn these lessons about the dangers of drugs through more formal means—from schools, parents, and focused messages in the media, for example—and that this more formalized prevention effort be institutionalized so that it will endure for the long term. Clearly, for the foreseeable future, American young people will be aware of the psychoactive potential of a host of drugs and will continue to have access to them. That means that each new generation of young people must learn the reasons that they should *not* use drugs. Otherwise their natural curiosity and desires for new experiences will lead a great many of them to use drugs.

The following facts help to put into perspective the magnitude and variety of substance use problems that presently remain among American young people:

- By the end of eighth grade, nearly four in every ten (37%) American eighth-grade students have tried an ***illicit drug*** (if inhalants are included as an illicit drug), and by twelfth grade, more than half (56%) have done so.

- By their late twenties, two-thirds (65%) of today's American young adults have tried an ***illicit drug***, including 36% who have tried some ***illicit drug other than marijuana*** (usually in addition to marijuana). (These figures do not include inhalants.)

- One out of five young Americans (20% in 1999) has tried ***cocaine*** by the age of 30, and 10% have tried it by their senior year of high school (i.e., by age 17 or 18). More than one in every twenty-five seniors (4.6%) has tried the particularly dangerous form of cocaine called ***crack***. In the young adult sample, 4.8% have tried crack, including 5.6% by age 29-30.

- Over one in every twenty (6.0%) high school seniors in 1999 currently smokes ***marijuana daily***. Among young adults aged 19 to 28, the percentage is slightly less (4.4%). Among seniors in 1999, one in every five or six (17.9%) had been daily marijuana smokers at some time in their

lives for at least a month, and among young adults the comparable figure is one in seven (14.2%).

- About a third of all seniors (31%) had consumed ***five or more drinks in a row*** at least once in the two weeks prior to the survey, and such behavior tends to increase among young adults one to four years past high school. The prevalence of such behavior among male college students reaches 50%.

- Over one-third (35%) of seniors in 1999 were current ***cigarette*** smokers and 23% already were current daily smokers. In addition, we know from studying previous cohorts that many young adults increase their rates of smoking within a year or so after they leave high school.

- Despite the substantial improvement in this country's drug situation between 1979 and 1991, it is still true that this nation's secondary school students and young adults show a level of involvement with illicit drugs that is as great as has been documented in any other industrialized nation in the world.[9] Even by longer-term historical standards in this country, these rates remain extremely high, though in general they are not as high as in the peak years of the epidemic in the late 1970s. Heavy drinking also remains widespread and troublesome; and certainly the continuing initiation of a large and (until recently) growing proportion of young people to cigarette smoking is a matter of the greatest public health concern.

- Finally, we note the seemingly unending capacity of pharmacological experts and amateurs to discover new substances with abuse potential that can be used to alter mood and consciousness. There is also a great capacity for our young people to discover the abuse potential of existing products, such as Robitussin™, and to rediscover older drugs, such as ***LSD*** and ***heroin***. While as a society we have made significant progress on a number of fronts in the fight against drug abuse, we must remain vigilant against the opening of new fronts, as well as the reemergence of trouble on older ones.

- In fact, one of the dynamics that keeps the drug epidemic rolling is the emergence of new drugs, whose hazards are little known. In 1999 we saw this happen with the drug ***MDMA (ecstasy)***. Other drugs like ***ketamine*** and ***GHB*** have arrived so recently that we do not yet have questions in the survey about their use. The spread of such new drugs appears to be

[9] A recently published report from an international collaborative study, modeled largely after the Monitoring the Future study, suggests that in 1995 the United Kingdom had illicit drug use rates among fifteen-year-old students about comparable to those observed in the United States. All the other European countries had substantially lower rates. See B. Hibell et al. (Eds.). (1997). *The 1995 ESPAD Report. (European School Survey Project on Alcohol and Other Drugs) Use among students in 26 European countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs and the Council of Europe.

facilitated and hastened today by young people's widespread use of chat rooms and other sites on the Internet. We predict a continuous flow of such new substances onto the scene and believe that the task of rapidly identifying their emergence and quickly demystifying them will be increasingly important.

- The drug problem is not an enemy that can be vanquished, as in a war. It is more a recurring and relapsing problem that must be contained to the extent possible on a long-term, ongoing basis. Therefore, it is a problem which requires an ongoing, dynamic response from our society—one which takes into account the continuing generational replacement of our children and the generational forgetting of the dangers of drugs that can occur with that replacement.

TABLE 2-1
Trends in Lifetime Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

(Entries are percentages)

	Lifetime									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Any Illicit Drug[a]										
8th Grade	18.7	20.6	22.5	25.7	28.5	31.2	29.4	29.0	28.3	-0.7
10th Grade	30.6	29.8	32.8	37.4	40.9	45.4	47.3	44.9	46.2	+1.3
12th Grade	44.1	40.7	42.9	45.6	48.4	50.8	54.3	54.1	54.7	+0.6
College Students	50.4	48.8	45.9	45.5	45.5	47.4	49.0	52.9	53.2	+0.3
Young Adults	62.2	60.2	59.6	57.5	57.4	56.4	56.7	57.0	57.4	+0.4
Any Illicit Drug Other Than Marijuana[a]										
8th Grade	14.3	15.6	16.8	17.5	18.8	19.2	17.7	16.9	16.3	-0.6
10th Grade	19.1	19.2	20.9	21.7	24.3	25.5	25.0	23.6	24.0	+0.4
12th Grade	26.9	25.1	26.7	27.6	28.1	28.5	30.0	29.4	29.4	0.0
College Students	25.8	26.1	24.3	22.0	24.5	22.7	24.4	24.8	25.5	+0.7
Young Adults	37.8	37.0	34.6	33.4	32.8	31.0	30.5	29.9	30.2	+0.3
Any Illicit Drug Including Inhalants[a,b]										
8th Grade	28.5	29.6	32.3	35.1	38.1	39.4	38.1	37.8	37.2	-0.6
10th Grade	36.1	36.2	38.7	42.7	45.9	49.8	50.9	49.3	49.9	+0.6
12th Grade	47.6	44.4	46.6	49.1	51.5	53.5	56.3	56.1	56.3	+0.2
College Students	52.0	50.3	49.1	47.0	47.0	49.1	50.7	55.4	54.4	-0.9
Young Adults	63.4	61.2	61.2	58.5	59.0	58.2	58.4	58.5	58.5	0.0
Marijuana/Hashish										
8th Grade	10.2	11.2	12.6	16.7	19.9	23.1	22.6	22.2	22.0	-0.2
10th Grade	23.4	21.4	24.4	30.4	34.1	39.8	42.3	39.6	40.9	+1.3
12th Grade	36.7	32.6	35.3	38.2	41.7	44.9	49.6	49.1	49.7	+0.6
College Students	46.3	44.1	42.0	42.2	41.7	45.1	46.1	49.9	50.8	+0.9
Young Adults	58.6	56.4	55.9	53.7	53.6	53.4	53.8	54.4	54.6	+0.2
Inhalants[b,c]										
8th Grade	17.6	17.4	19.4	19.9	21.6	21.2	21.0	20.5	19.7	-0.8
10th Grade	15.7	16.6	17.5	18.0	19.0	19.3	18.3	18.3	17.0	-1.3
12th Grade	17.6	16.6	17.4	17.7	17.4	16.6	16.1	15.2	15.4	+0.2
College Students	14.4	14.2	14.8	12.0	13.8	11.4	12.4	12.8	12.4	-0.4
Young Adults	13.4	13.5	14.1	13.2	14.5	14.1	14.1	14.2	14.2	0.0
Nitrites[d]										
8th Grade	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—
12th Grade	1.6	1.5	1.4	1.7	1.5	1.8	2.0	2.7	1.7	-1.0
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	1.4	1.2	1.3	1.0	—	—	—	—	—	—

(Table continued on next page)

TABLE 2-1 (cont.)
Trends in Lifetime Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Lifetime									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Hallucinogens[c]										
8th Grade	3.2	3.8	3.9	4.3	5.2	5.9	5.4	4.9	4.8	-0.1
10th Grade	6.1	6.4	6.8	8.1	9.3	10.5	10.5	9.8	9.7	-0.1
12th Grade	9.6	9.2	10.9	11.4	12.7	14.0	15.1	14.1	13.7	-0.4
College Students	11.3	12.0	11.8	10.0	13.0	12.6	13.8	15.2	14.8	-0.4
Young Adults	15.7	15.7	15.4	15.4	16.1	16.4	16.8	17.4	18.0	+0.5
LSD										
8th Grade	2.7	3.2	3.5	3.7	4.4	5.1	4.7	4.1	4.1	0.0
10th Grade	5.6	5.8	6.2	7.2	8.4	9.4	9.5	8.5	8.5	0.0
12th Grade	8.8	8.6	10.3	10.5	11.7	12.6	13.6	12.6	12.2	-0.4
College Students	9.6	10.6	10.6	9.2	11.5	10.8	11.7	13.1	12.7	-0.5
Young Adults	13.5	13.8	13.6	13.8	14.5	15.0	15.0	15.7	16.2	+0.5
Hallucinogens Other Than LSD										
8th Grade	1.4	1.7	1.7	2.2	2.5	3.0	2.6	2.5	2.4	-0.1
10th Grade	2.2	2.5	2.8	3.8	3.9	4.7	4.8	5.0	4.7	-0.3
12th Grade	3.7	3.3	3.9	4.9	5.4	6.8	7.5	7.1	6.7	-0.4
College Students	6.0	5.7	5.4	4.4	6.5	6.5	7.5	8.7	8.8	+0.1
Young Adults	8.4	8.0	7.6	7.4	7.8	7.9	8.5	9.4	9.3	-0.1
PCP[d]										
8th Grade	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—
12th Grade	2.9	2.4	2.9	2.8	2.7	4.0	3.9	3.9	3.4	-0.5
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	3.1	2.0	1.9	2.0	2.2	1.9	2.4	2.7	2.3	-0.4
MDMA (Ecstasy)[d]										
8th Grade	—	—	—	—	—	3.4	3.2	2.7	2.7	0.0
10th Grade	—	—	—	—	—	5.6	5.7	5.1	6.0	+0.9
12th Grade	—	—	—	—	—	6.1	6.9	5.8	8.0	+2.3s
College Students	2.0	2.9	2.3	2.1	3.1	4.3	4.7	6.8	8.4	+1.5
Young Adults	3.2	3.9	3.8	3.8	4.5	5.2	5.1	7.2	7.1	-0.1

(Table continued on next page)

TABLE 2-1 (cont.)
Trends in Lifetime Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Lifetime									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Cocaine										
8th Grade	2.3	2.9	2.9	3.6	4.2	4.5	4.4	4.6	4.7	+0.1
10th Grade	4.1	3.3	3.6	4.3	5.0	6.5	7.1	7.2	7.7	+0.5
12th Grade	7.8	6.1	6.1	5.9	6.0	7.1	8.7	9.3	9.8	+0.5
College Students	9.4	7.9	6.3	5.0	5.5	5.0	5.6	8.1	8.4	+0.3
Young Adults	21.0	19.5	16.9	15.2	13.7	12.9	12.1	12.3	12.8	+0.5
Crack										
8th Grade	1.3	1.6	1.7	2.4	2.7	2.9	2.7	3.2	3.1	-0.1
10th Grade	1.7	1.5	1.8	2.1	2.8	3.3	3.6	3.9	4.0	+0.1
12th Grade	3.1	2.6	2.6	3.0	3.0	3.3	3.9	4.4	4.6	+0.2
College Students	1.5	1.7	1.3	1.0	1.8	1.2	1.4	2.2	2.4	+0.2
Young Adults	4.8	5.1	4.3	4.4	3.8	3.9	3.6	3.8	4.3	+0.5
Other Cocaine[e]										
8th Grade	2.0	2.4	2.4	3.0	3.4	3.8	3.5	3.7	3.8	+0.1
10th Grade	3.8	3.0	3.3	3.8	4.4	5.5	6.1	6.4	6.8	+0.4
12th Grade	7.0	5.3	5.4	5.2	5.1	6.4	8.2	8.4	8.8	+0.4
College Students	9.0	7.6	6.3	4.6	5.2	4.6	5.0	7.4	7.8	+0.5
Young Adults	19.8	18.4	15.1	13.9	12.4	11.9	11.3	11.5	11.8	+0.3
Heroin[f]										
8th Grade	1.2	1.4	1.4	2.0	2.3	2.4	2.1	2.3	2.3	0.0
10th Grade	1.2	1.2	1.3	1.5	1.7	2.1	2.1	2.3	2.3	0.0
12th Grade	0.9	1.2	1.1	1.2	1.6	1.8	2.1	2.0	2.0	0.0
College Students	0.5	0.5	0.6	0.1	0.6	0.7	0.9	1.7	0.9	-0.8s
Young Adults	0.9	0.9	0.9	0.8	1.1	1.3	1.3	1.6	1.7	+0.1
With a needle[g]										
8th Grade	—	—	—	—	1.5	1.6	1.3	1.4	1.6	+0.2
10th Grade	—	—	—	—	1.0	1.1	1.1	1.2	1.3	+0.1
12th Grade	—	—	—	—	0.7	0.8	0.9	0.8	0.9	+0.1
College Students	—	—	—	—	0.4	0.1	0.2	0.5	0.8	+0.3
Young Adults	—	—	—	—	0.4	0.4	0.3	0.4	0.6	+0.2
Without a needle[g]										
8th Grade	—	—	—	—	1.5	1.6	1.4	1.5	1.4	-0.1
10th Grade	—	—	—	—	1.1	1.7	1.7	1.7	1.6	-0.1
12th Grade	—	—	—	—	1.4	1.7	2.1	1.6	1.8	+0.2
College Students	—	—	—	—	0.5	1.0	1.2	2.1	1.0	-1.1
Young Adults	—	—	—	—	0.9	1.3	1.5	1.7	1.9	+0.2
Other Narcotics[h]										
8th Grade	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—
12th Grade	6.6	6.1	6.4	6.6	7.2	8.2	9.7	9.8	10.2	+0.4
College Students	7.3	7.3	6.2	5.1	7.2	5.7	8.2	8.7	8.7	+0.1
Young Adults	9.3	8.9	8.1	8.2	9.0	8.3	9.2	9.1	9.5	+0.4

(Table continued on next page)

TABLE 2-1 (cont.)
Trends in Lifetime Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Lifetime									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Amphetamines[b]										
8th Grade	10.5	10.8	11.8	12.3	13.1	13.5	12.3	11.3	10.7	-0.6
10th Grade	13.2	13.1	14.9	15.1	17.4	17.7	17.0	16.0	15.7	-0.3
12th Grade	15.4	13.9	15.1	15.7	15.3	15.3	16.5	16.4	16.3	-0.1
College Students	13.0	10.5	10.1	9.2	10.7	9.5	10.6	10.6	11.9	+1.3
Young Adults	22.4	20.2	18.7	17.1	16.6	15.3	14.6	14.3	14.1	-0.2
Methamphetamine[c]										
8th Grade	—	—	—	—	—	—	—	—	4.5	—
10th Grade	—	—	—	—	—	—	—	—	7.3	—
12th Grade	—	—	—	—	—	—	—	—	8.2	—
College Students	—	—	—	—	—	—	—	—	7.1	—
Young Adults	—	—	—	—	—	—	—	—	8.8	—
Ice[d]										
8th Grade	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—
12th Grade	3.3	2.9	3.1	3.4	3.9	4.4	4.4	5.3	4.8	-0.5
College Students	1.3	0.6	1.6	1.3	1.0	0.8	1.6	2.2	2.8	+0.5
Young Adults	2.9	2.2	2.7	2.5	2.1	3.1	2.5	3.4	3.3	0.0
Barbiturates[b]										
8th Grade	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—
12th Grade	6.2	5.5	6.3	7.0	7.4	7.6	8.1	8.7	8.9	+0.2
College Students	3.5	3.8	3.5	3.2	4.0	4.6	5.2	5.7	6.7	+1.0
Young Adults	8.2	7.4	6.5	6.4	6.7	6.6	6.5	6.9	7.4	+0.4
Tranquilizers[b]										
8th Grade	3.8	4.1	4.4	4.6	4.5	5.3	4.8	4.6	4.4	-0.2
10th Grade	5.8	5.9	5.7	5.4	6.0	7.1	7.3	7.8	7.9	+0.1
12th Grade	7.2	6.0	6.4	6.6	7.1	7.2	7.8	8.5	9.3	+0.8
College Students	6.8	6.9	6.3	4.4	5.4	5.3	6.9	7.7	8.2	+0.5
Young Adults	11.8	11.3	10.5	9.9	9.7	9.3	8.6	9.6	9.6	-0.1
Rohypnol[d,b]										
8th Grade	—	—	—	—	—	1.5	1.1	1.4	1.3	-0.1
10th Grade	—	—	—	—	—	1.5	1.7	2.0	1.8	-0.2
12th Grade	—	—	—	—	—	1.2	1.8	3.0	2.0	-1.0
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—

(Table continued on next page)

TABLE 2-1 (cont.)
Trends in Lifetime Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Lifetime									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Alcohol[1]										
Any use										
8th Grade	70.1	69.3	67.1	—	—	—	—	—	—	—
			55.7	55.8	54.5	55.3	53.8	52.5	52.1	-0.4
10th Grade	83.8	82.3	80.8	—	—	—	—	—	—	—
			71.6	71.1	70.5	71.8	72.0	69.8	70.6	+0.8
12th Grade	88.0	87.5	87.0	—	—	—	—	—	—	—
			80.0	80.4	80.7	79.2	81.7	81.4	80.0	-1.4
College Students	93.6	91.8	89.3	88.2	88.5	88.4	87.3	88.5	88.0	-0.5
Young Adults	94.1	93.4	92.1	91.2	91.6	91.2	90.7	90.6	90.2	-0.4
Been Drunk[1]										
8th Grade	26.7	26.8	26.4	25.9	25.3	26.8	25.2	24.8	24.8	0.0
10th Grade	50.0	47.7	47.9	47.2	46.9	48.5	49.4	46.7	48.9	+2.2
12th Grade	65.4	63.4	62.5	62.9	63.2	61.8	64.2	62.4	62.3	-0.1
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—
Cigarettes										
Any use										
8th Grade	44.0	45.2	45.3	46.1	46.4	49.2	47.3	45.7	44.1	-1.6
10th Grade	55.1	53.5	56.3	56.9	57.6	61.2	60.2	57.7	57.6	-0.1
12th Grade	63.1	61.8	61.9	62.0	64.2	63.5	65.4	65.3	64.6	-0.7
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—
Smokeless Tobacco[4]										
8th Grade	22.2	20.7	18.7	19.9	20.0	20.4	16.8	15.0	14.4	-0.6
10th Grade	28.2	26.6	28.1	29.2	27.6	27.4	26.3	22.7	20.4	-2.3
12th Grade	—	32.4	31.0	30.7	30.9	29.8	25.3	26.2	23.4	-2.8
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—
Steroids[5]										
8th Grade	1.9	1.7	1.6	2.0	2.0	1.8	1.8	2.3	2.7	+0.4
10th Grade	1.8	1.7	1.7	1.8	2.0	1.8	2.0	2.0	2.7	+0.7ss
12th Grade	2.1	2.1	2.0	2.4	2.3	1.9	2.4	2.7	2.9	+0.2
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	1.7	1.9	1.5	1.3	1.5	1.5	1.4	1.4	1.9	+0.4

Footnotes for Table 2-1 to Table 2-3

NOTES: Level of significance of difference between the two years: s = .05, ss = .01, sss = .001.
'—' indicates data not available. '*' indicates less than .05 percent but greater than 0 percent.
Any apparent inconsistency between the change estimate and the prevalence of use estimates for the two years is due to rounding error.
SOURCE: The Monitoring the Future Study, the University of Michigan.

Approximate Weighted Ns	1991	1992	1993	1994	1995	1996	1997	1998	1999
8th Graders	17,500	18,600	18,300	17,300	17,500	17,800	18,600	18,100	16,700
10th Graders	14,800	14,800	15,300	15,800	17,000	15,600	15,500	15,000	13,600
12th Graders	15,000	15,800	16,300	15,400	15,400	14,300	15,400	15,200	13,600
College Students	1,410	1,490	1,490	1,410	1,450	1,450	1,480	1,440	1,440
Young Adults	6,600	6,800	6,700	6,500	6,400	6,300	6,400	6,200	6,000

[a]For 12th graders, college students, and young adults only: Use of "any illicit drug" includes any use of marijuana, LSD, other hallucinogens, crack, other cocaine, or heroin, or any use of other narcotics, amphetamines, barbiturates, or tranquilizers not under a doctor's orders. For 8th and 10th graders only: The use of other narcotics and barbiturates has been excluded, because these younger respondents appear to overreport use (perhaps because they include the use of nonprescription drugs in their answers).

[b]For 12th graders, college students, and young adults only: Data based on on five of six forms in 1991-98; N is five-sixths of N indicated. Data based on three of six forms in 1999; N is three-sixths of N indicated.

[c]Inhalants are unadjusted for underreporting of amyl and butyl nitrites; hallucinogens are unadjusted for underreporting of PCP.

[d]For 8th and 10th graders only: MDMA data based on one form in 1996; N is one-half of N indicated. Beginning in 1997, data based on one-third of N indicated due to changes in the questionnaire forms. Rohypnol data based on one-third of N due to changes in the questionnaire forms. Smokeless tobacco data based on one of two forms for 1991–96 and on two of four forms beginning in 1997; N is one-half of N indicated. For 12th graders only: Data based on one form; N is one-sixth of N indicated. For college students and young adults only: Data based on two forms; N is one-third of N indicated. Questions about nitrite use were dropped from the college student and young adult questionnaires in 1995. Questions about smokeless tobacco use were dropped from the college student and young adult analyses in 1989.

[e]For 12th graders, college students, and young adults only: Data based on four of six forms; N is four-sixths of N indicated for each group.

[f]In 1995, the heroin question was changed in three of six forms for 12th graders and in one of two forms for 8th and 10th graders. Separate questions were asked for use with injection and without injection. In 1996, the heroin question was changed in all remaining 8th and 10th grade forms. Data presented here represent the combined data from all forms.

[g]For 8th and 10th graders only: Data based on one of two forms in 1995; N is one-half of N indicated. For 12th graders only: Data based on three of six forms; N is three-sixths of N indicated.

[h]Only drug use which was not under a doctor's orders is included here.

[i]For 8th and 10th graders only: Data based on one of four forms; N is one-third of N indicated.

[j]For 12th graders, college students, and young adults only: Data based on two of six forms; N is two-sixths of N indicated for each group.

[k]For 8th and 10th graders only: Data based on one of two forms in 1996–97; N is one-half of N indicated. Data based on three of four forms in 1998; N is two-thirds of N indicated. Data based on two of four forms beginning in 1999; N is one-third of N indicated.

[l]For 8th, 10th, and 12th graders only: In 1993, the question text was changed slightly in half of the forms to indicate that a "drink" meant "more than just a few sips." The data in the upper line for alcohol came from forms using the original wording, while the data in the lower line came from forms using the revised wording. In 1993, each line of data was based on one of two forms for the 8th and 10th graders and on three of six forms for the 12th graders. N is one-half of N indicated for these groups. Beginning in 1994, data were based on all forms for all grades. For college students and young adults, the revision of the question text resulted in rather little change in the reported prevalence of use. The data for all forms are used to provide the most reliable estimate of change.

[m]Daily used is defined as use on twenty or more occasions in the past thirty days except for cigarettes and smokeless tobacco, for which actual daily use is measured, and for 5+ drinks, for which the prevalence of having five or more drinks in a row in the last two weeks is measured.

TABLE 2-2
Trends in Annual and 30-Day Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Annual										30-Day									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Any Illicit Drug[a]																				
8th Grade	11.3	12.9	15.1	18.5	21.4	23.6	22.1	21.0	20.5	-0.5	5.7	6.8	8.4	10.9	12.4	14.6	12.9	12.1	12.2	+0.1
10th Grade	21.4	20.4	24.7	30.0	33.3	37.5	38.5	35.0	35.9	+0.9	11.6	11.0	14.0	18.5	20.2	23.2	23.0	21.5	22.1	+0.6
12th Grade	29.4	27.1	31.0	35.8	39.0	40.2	42.4	41.4	42.1	+0.7	16.4	14.4	18.3	21.9	23.8	24.6	26.2	25.6	25.9	+0.3
College Students	29.2	30.6	30.6	31.4	33.5	34.2	34.1	37.8	36.9	-0.9	15.2	16.1	15.1	16.0	19.1	17.6	19.2	19.7	21.6	+1.8
Young Adults	27.0	28.3	28.4	28.4	29.8	29.2	29.2	29.9	30.3	+0.4	15.1	14.8	14.9	15.3	15.8	15.8	16.4	16.1	17.1	+1.0
Any Illicit Drug Other Than Marijuana[a]																				
8th Grade	8.4	9.3	10.4	11.3	12.6	13.1	11.8	11.0	10.5	-0.5	3.8	4.7	5.3	5.6	6.5	6.9	6.0	5.5	5.5	0.0
10th Grade	12.2	12.3	13.9	15.2	17.5	18.4	18.2	16.6	16.7	+0.1	5.5	5.7	6.5	7.1	8.9	8.9	8.8	8.6	8.6	0.0
12th Grade	16.2	14.9	17.1	18.0	19.4	19.8	20.7	20.2	20.7	+0.5	7.1	6.3	7.9	8.8	10.0	9.5	10.7	10.7	10.4	-0.3
College Students	13.2	13.1	12.5	12.2	15.9	12.8	15.8	14.0	15.4	+1.3	4.3	4.6	5.4	4.6	6.3	4.5	6.8	6.1	6.4	+0.2
Young Adults	14.3	14.1	13.0	13.0	13.8	13.2	13.6	13.2	13.7	+0.5	5.4	5.5	4.9	5.3	5.7	4.7	5.5	5.5	6.0	+0.5
Any Illicit Drug Including Inhalants[a,b]																				
8th Grade	16.7	18.2	21.1	24.2	27.1	28.7	27.2	26.2	25.3	-0.9	8.8	10.0	12.0	14.3	16.1	17.5	16.0	14.9	15.1	+0.2
10th Grade	23.9	23.5	27.4	32.5	35.6	39.6	40.3	37.1	37.7	+0.6	13.1	12.6	15.5	20.0	21.6	24.5	24.1	22.5	23.1	+0.6
12th Grade	31.2	28.8	32.5	37.6	40.2	41.9	43.3	42.4	42.8	+0.4	17.8	15.5	19.3	23.0	24.8	25.5	26.9	26.6	26.4	-0.2
College Students	29.8	31.1	31.7	31.9	33.7	35.1	35.5	39.1	37.4	-1.6	15.1	16.5	15.7	16.4	19.6	18.0	19.6	21.0	21.8	+0.9
Young Adults	27.8	29.2	28.9	29.2	30.4	30.2	30.1	30.6	30.6	+0.1	15.4	15.3	15.1	16.1	16.1	16.4	16.9	16.7	17.4	+0.7
Marijuana/Hashish																				
8th Grade	6.2	7.2	9.2	13.0	15.8	18.3	17.7	16.9	16.5	-0.4	3.2	3.7	5.1	7.8	9.1	11.3	10.2	9.7	9.7	0.0
10th Grade	16.5	15.2	19.2	25.2	28.7	33.6	34.8	31.1	32.1	+1.0	8.7	8.1	10.9	15.8	17.2	20.4	20.5	18.7	19.4	+0.7
12th Grade	23.9	21.9	26.0	30.7	34.7	35.8	38.5	37.5	37.8	+0.3	13.8	11.9	15.5	19.0	21.2	21.9	23.7	22.8	23.1	+0.3
College Students	26.5	27.7	27.9	29.3	31.2	33.1	31.6	35.9	35.2	-0.7	14.1	14.6	14.2	15.1	18.6	17.5	17.7	18.6	20.7	+2.0
Young Adults	23.8	25.2	25.1	25.5	26.5	27.0	26.8	27.4	27.6	+0.2	13.5	13.3	13.4	14.1	14.0	15.1	15.0	14.9	15.6	+0.7
Inhalants[b,c]																				
8th Grade	9.0	9.5	11.0	11.7	12.8	12.2	11.8	11.1	10.3	-0.8	4.4	4.7	5.4	5.6	6.1	5.8	5.6	4.8	5.0	+0.2
10th Grade	7.1	7.5	8.4	9.1	9.6	9.5	8.7	8.0	7.2	-0.8	2.7	2.7	3.3	3.6	3.5	3.3	3.0	2.9	2.6	-0.3
12th Grade	6.6	6.2	7.0	7.7	8.0	7.6	6.7	6.2	5.6	-0.6	2.4	2.3	2.5	2.7	3.2	2.5	2.5	2.3	2.0	-0.3
College Students	3.5	3.1	3.8	3.0	3.9	3.6	4.1	3.0	3.2	+0.2	0.9	1.1	1.3	0.6	1.6	0.8	0.8	0.6	1.5	+0.8
Young Adults	2.0	1.9	2.1	2.1	2.4	2.2	2.3	2.1	2.3	+0.2	0.5	0.6	0.7	0.5	0.7	0.5	0.5	0.7	0.8	+0.1
Nitrites[d]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	0.9	0.5	0.9	1.1	1.1	1.6	1.2	1.4	0.9	-0.5	0.4	0.3	0.6	0.4	0.4	0.7	0.7	1.0	0.4	-0.6s
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	0.2	0.1	0.4	0.3	—	—	—	—	—	—	*	0.1	0.2	0.1	—	—	—	—	—	—

(Table continued on next page)

TABLE 2-2 (cont.)
Trends in Annual and 30-Day Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Annual										30-Day									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Hallucinogens[1]																				
8th Grade	1.9	2.5	2.6	2.7	3.6	4.1	3.7	3.4	2.9	-0.5	0.8	1.1	1.2	1.3	1.7	1.9	1.8	1.4	1.3	-0.1
10th Grade	4.0	4.3	4.7	5.8	7.2	7.8	7.6	6.9	6.9	0.0	1.6	1.8	1.9	2.4	3.3	2.8	3.3	3.2	2.9	-0.3
12th Grade	5.8	5.9	7.4	7.6	9.3	10.1	9.8	9.0	9.4	+0.4	2.2	2.1	2.7	3.1	4.4	3.5	3.9	3.8	3.5	-0.3
College Students	6.3	6.8	6.0	6.2	8.2	6.9	7.7	7.2	7.8	+0.7	1.2	2.3	2.5	2.1	3.3	1.9	2.1	2.1	2.0	-0.1
Young Adults	4.5	5.0	4.5	4.8	5.6	5.6	5.9	5.2	5.4	+0.3	1.1	1.5	1.2	1.4	1.7	1.2	1.5	1.4	1.3	-0.1
LSD																				
8th Grade	1.7	2.1	2.3	2.4	3.2	3.5	3.2	2.8	2.4	-0.4	0.6	0.9	1.0	1.1	1.4	1.5	1.5	1.1	1.1	0.0
10th Grade	3.7	4.0	4.2	5.2	6.5	6.9	6.7	5.9	6.0	+0.1	1.5	1.6	1.6	2.0	3.0	2.4	2.8	2.7	2.3	-0.4
12th Grade	5.2	5.6	6.8	6.9	8.4	8.8	8.4	7.6	8.1	+0.5	1.9	2.0	2.4	2.6	4.0	2.5	3.1	3.2	2.7	-0.5
College Students	5.1	5.7	5.1	5.2	6.9	5.2	5.0	4.4	5.4	+1.0	0.8	1.8	1.6	1.8	2.5	0.9	1.1	1.5	1.2	-0.3
Young Adults	3.8	4.3	3.8	4.0	4.6	4.5	4.4	3.5	4.0	+0.6	0.8	1.1	0.8	1.1	1.3	0.7	0.9	1.0	0.8	-0.1
Hallucinogens Other Than LSD																				
8th Grade	0.7	1.1	1.0	1.3	1.7	2.0	1.8	1.6	1.5	-0.1	0.3	0.4	0.5	0.7	0.8	0.9	0.7	0.7	0.6	-0.1
10th Grade	1.3	1.4	1.9	2.4	2.8	3.3	3.3	3.4	3.2	-0.2	0.4	0.5	0.7	1.0	1.0	1.0	1.2	1.4	1.2	-0.2
12th Grade	2.0	1.7	2.2	3.1	3.8	4.4	4.6	4.6	4.3	-0.3	0.7	0.5	0.8	1.2	1.3	1.6	1.7	1.6	1.6	0.0
College Students	3.1	2.6	2.7	2.8	4.0	4.1	4.9	4.4	4.5	+0.1	0.6	0.7	1.1	0.8	1.6	1.2	1.2	0.7	1.2	+0.5
Young Adults	1.7	1.9	1.9	2.0	2.5	2.8	3.1	3.0	3.0	-0.1	0.3	0.5	0.6	0.6	0.6	0.6	0.7	0.5	0.6	+0.1
PCP[4]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	1.4	1.4	1.4	1.6	1.8	2.6	2.3	2.1	1.8	-0.3	0.5	0.6	1.0	0.7	0.6	1.3	0.7	1.0	0.8	-0.2
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	0.3	0.3	0.2	0.3	0.3	0.2	0.5	0.6	0.6	0.0	0.1	0.2	0.2	0.1	0.0	0.1	0.1	0.2	0.2	0.0
MDMA (Ecstasy)[4]																				
8th Grade	—	—	—	—	—	2.3	2.3	1.8	1.7	-0.1	—	—	—	—	—	1.0	1.0	0.9	0.8	-0.1
10th Grade	—	—	—	—	—	4.6	3.9	3.3	4.4	+1.1s	—	—	—	—	—	1.8	1.3	1.3	1.8	+0.5
12th Grade	—	—	—	—	—	4.6	4.0	3.6	5.6	+2.0ss	—	—	—	—	—	2.0	1.6	1.5	2.5	+1.0s
College Students	0.9	2.0	0.8	0.5	2.4	2.8	2.4	3.9	5.5	+1.6	0.2	0.4	0.3	0.2	0.7	0.7	0.8	0.8	2.1	+1.3
Young Adults	0.8	1.0	0.8	0.7	1.6	1.7	2.1	2.9	3.6	+0.7	0.1	0.3	0.3	0.2	0.4	0.3	0.6	0.8	1.3	+0.6

(Table continued on next page)

TABLE 2-2 (cont.)
Trends in Annual and 30-Day Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Annual										30-Day									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Cocaine																				
8th Grade	1.1	1.5	1.7	2.1	2.6	3.0	2.8	3.1	2.7	-0.4	0.5	0.7	0.7	1.0	1.2	1.3	1.1	1.4	1.3	-0.1
10th Grade	2.2	1.9	2.1	2.8	3.5	4.2	4.7	4.7	4.9	+0.2	0.7	0.7	0.9	1.2	1.7	1.7	2.0	2.1	1.8	-0.3
12th Grade	3.5	3.1	3.3	3.6	4.0	4.9	5.5	5.7	6.2	+0.5	1.4	1.3	1.3	1.5	1.8	2.0	2.3	2.4	2.6	+0.2
College Students	3.6	3.0	2.7	2.0	3.6	2.9	3.4	4.6	4.6	0.0	1.0	1.0	0.7	0.6	0.7	0.8	1.6	1.6	1.2	-0.4
Young Adults	6.2	5.7	4.7	4.3	4.4	4.1	4.7	4.9	5.4	+0.5	2.0	1.8	1.4	1.3	1.5	1.2	1.6	1.7	1.9	+0.3
Crack																				
8th Grade	0.7	0.9	1.0	1.3	1.6	1.8	1.7	2.1	1.8	-0.4s	0.3	0.5	0.4	0.7	0.7	0.8	0.7	0.9	0.8	-0.1
10th Grade	0.9	0.9	1.1	1.4	1.8	2.1	2.2	2.5	2.4	-0.1	0.3	0.4	0.5	0.6	0.9	0.8	0.9	1.1	0.8	-0.3s
12th Grade	1.5	1.5	1.5	1.9	2.1	2.1	2.4	2.5	2.7	+0.2	0.7	0.6	0.7	0.8	1.0	1.0	0.9	1.0	1.1	+0.1
College Students	0.5	0.4	0.6	0.5	1.1	0.6	0.4	1.0	0.9	-0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	+0.1
Young Adults	1.2	1.4	1.3	1.1	1.1	1.1	1.0	1.1	1.4	+0.3	0.4	0.4	0.4	0.3	0.2	0.3	0.3	0.3	0.4	+0.2
Other Cocaine[e]																				
8th Grade	1.0	1.2	1.3	1.7	2.1	2.5	2.2	2.4	2.3	-0.1	0.5	0.5	0.6	0.9	1.0	1.0	0.8	1.0	1.1	+0.1
10th Grade	2.1	1.7	1.8	2.4	3.0	3.5	4.1	4.0	4.4	+0.4	0.6	0.6	0.7	1.0	1.4	1.3	1.6	1.8	1.6	-0.2
12th Grade	3.2	2.6	2.9	3.0	3.4	4.2	5.0	4.9	5.8	+0.9	1.2	1.0	1.2	1.3	1.3	1.6	2.0	2.0	2.5	+0.5
College Students	3.2	2.4	2.5	1.8	3.3	2.3	3.0	4.2	4.2	0.0	1.0	0.9	0.6	0.3	0.8	0.6	1.3	1.5	1.0	-0.5
Young Adults	5.4	5.1	3.9	3.6	3.9	3.8	4.3	4.5	4.8	+0.4	1.8	1.7	1.1	1.0	1.3	1.1	1.5	1.5	1.6	+0.2
Heroin[f]																				
8th Grade	0.7	0.7	0.7	1.2	1.4	1.6	1.3	1.3	1.4	+0.1	0.3	0.4	0.4	0.6	0.6	0.7	0.6	0.6	0.6	0.0
10th Grade	0.5	0.6	0.7	0.9	1.1	1.2	1.4	1.4	1.4	0.0	0.2	0.2	0.3	0.4	0.6	0.5	0.6	0.7	0.7	0.0
12th Grade	0.4	0.6	0.5	0.6	1.1	1.0	1.2	1.0	1.1	+0.1	0.2	0.3	0.2	0.3	0.6	0.5	0.5	0.5	0.5	0.0
College Students	0.1	0.1	0.1	0.1	0.3	0.4	0.3	0.6	0.2	-0.4	0.1	0.0	*	0.0	0.1	*	0.2	0.1	0.1	0.0
Young Adults	0.1	0.2	0.2	0.1	0.4	0.4	0.3	0.4	0.4	0.0	*	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
With a needle[g]																				
8th Grade	—	—	—	—	0.9	1.0	0.8	0.8	0.9	+0.1	—	—	—	—	0.4	0.5	0.4	0.5	0.4	-0.1
10th Grade	—	—	—	—	0.6	0.7	0.7	0.8	0.6	-0.2	—	—	—	—	0.3	0.3	0.3	0.4	0.3	-0.1
12th Grade	—	—	—	—	0.5	0.5	0.5	0.4	0.4	0.0	—	—	—	—	0.3	0.4	0.3	0.2	0.2	0.0
College Students	—	—	—	—	0.1	0.0	0.1	0.2	0.1	-0.1	—	—	—	—	0.0	0.0	0.1	0.0	0.1	+0.1
Young Adults	—	—	—	—	0.1	0.1	0.1	0.1	0.1	0.0	—	—	—	—	0.0	0.0	0.1	*	0.1	+0.1
Without a needle[g]																				
8th Grade	—	—	—	—	0.8	1.0	0.8	0.8	0.9	+0.1	—	—	—	—	0.3	0.4	0.4	0.3	0.4	+0.1
10th Grade	—	—	—	—	0.8	0.9	1.1	1.0	1.1	+0.1	—	—	—	—	0.3	0.3	0.4	0.5	0.5	0.0
12th Grade	—	—	—	—	1.0	1.0	1.2	0.8	1.0	+0.2	—	—	—	—	0.6	0.4	0.6	0.4	0.4	0.0
College Students	—	—	—	—	0.0	0.8	0.4	0.9	0.3	-0.5	—	—	—	—	0.0	0.1	0.2	0.2	0.3	+0.1
Young Adults	—	—	—	—	0.3	0.4	0.4	0.7	0.6	-0.1	—	—	—	—	0.1	*	0.1	0.2	0.2	+0.1
Other Narcotics[h]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	3.5	3.3	3.6	3.8	4.7	5.4	6.2	6.3	6.7	+0.4	1.1	1.2	1.3	1.5	1.8	2.0	2.3	2.4	2.6	+0.2
College Students	2.7	2.7	2.5	2.4	3.8	3.1	4.2	4.2	4.3	+0.1	0.6	1.0	0.7	0.4	1.2	0.7	1.3	1.1	1.0	-0.1
Young Adults	2.5	2.5	2.2	2.5	3.0	2.9	3.3	3.4	3.8	+0.4	0.6	0.7	0.7	0.6	0.9	0.7	0.9	0.9	1.2	+0.3

(Table continued on next page)

TABLE 2-2 (cont.)
Trends in Annual and 30-Day Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Annual										30-Day									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Amphetamines[b]																				
8th Grade	6.2	6.5	7.2	7.9	8.7	9.1	8.1	7.2	6.9	-0.3	2.6	3.3	3.6	3.6	4.2	4.6	3.8	3.3	3.4	+0.1
10th Grade	8.2	8.2	9.6	10.2	11.9	12.4	12.1	10.7	10.4	-0.3	3.3	3.6	4.3	4.5	5.3	5.5	5.1	5.1	5.0	-0.1
12th Grade	8.2	7.1	8.4	9.4	9.3	9.5	10.2	10.1	10.2	+0.1	3.2	2.8	3.7	4.0	4.0	4.1	4.8	4.6	4.5	-0.1
College Students	3.9	3.6	4.2	4.2	5.4	4.2	5.7	5.1	5.8	+0.8	1.0	1.1	1.5	1.5	2.2	0.9	2.1	1.7	2.3	+0.6
Young Adults	4.3	4.1	4.0	4.5	4.6	4.2	4.6	4.5	4.7	+0.2	1.5	1.5	1.5	1.7	1.7	1.5	1.7	1.7	1.9	+0.2
Methamphetamine[b,j]																				
8th Grade	—	—	—	—	—	—	—	—	3.2	—	—	—	—	—	—	—	—	—	1.1	—
10th Grade	—	—	—	—	—	—	—	—	4.6	—	—	—	—	—	—	—	—	—	1.8	—
12th Grade	—	—	—	—	—	—	—	—	4.7	—	—	—	—	—	—	—	—	—	1.7	—
College Students	—	—	—	—	—	—	—	—	3.3	—	—	—	—	—	—	—	—	—	1.2	—
Young Adults	—	—	—	—	—	—	—	—	2.8	—	—	—	—	—	—	—	—	—	0.8	—
Ice[j]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	1.4	1.3	1.7	1.8	2.4	2.8	2.3	3.0	1.9	-1.1ss	0.6	0.5	0.6	0.7	1.1	1.1	0.8	1.2	0.8	-0.4
College Students	0.1	0.2	0.7	0.8	1.1	0.3	0.8	1.0	0.5	-0.5	0.0	0.0	0.3	0.5	0.3	0.1	0.2	0.3	0.0	-0.3
Young Adults	0.3	0.4	0.8	0.9	1.2	0.9	0.9	1.1	0.9	-0.2	*	0.1	0.3	0.5	0.3	0.3	0.3	0.3	0.4	+0.1
Barbiturates[b]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10th Grade	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12th Grade	3.4	2.8	3.4	4.1	4.7	4.9	5.1	5.5	5.8	+0.3	1.4	1.1	1.3	1.7	2.2	2.1	2.1	2.6	2.6	0.0
College Students	1.2	1.4	1.5	1.2	2.0	2.3	3.0	2.5	3.2	+0.7	0.3	0.7	0.4	0.4	0.5	0.8	1.2	1.1	1.1	0.0
Young Adults	1.8	1.6	1.9	1.8	2.1	2.2	2.4	2.5	2.8	+0.2	0.5	0.5	0.6	0.6	0.8	0.8	0.9	0.9	1.1	+0.2
Tranquilizers[b]																				
8th Grade	1.8	2.0	2.1	2.4	2.7	3.3	2.9	2.6	2.5	-0.1	0.8	0.8	0.9	1.1	1.2	1.5	1.2	1.2	1.1	-0.1
10th Grade	3.2	3.5	3.3	3.3	4.0	4.6	4.9	5.1	5.4	+0.3	1.2	1.5	1.1	1.5	1.7	1.7	2.2	2.2	2.2	0.0
12th Grade	3.6	2.8	3.5	3.7	4.4	4.6	4.7	5.5	5.8	+0.3	1.4	1.0	1.2	1.4	1.8	2.0	1.8	2.4	2.5	+0.1
College Students	2.4	2.9	2.4	1.8	2.9	2.8	3.8	3.9	3.8	-0.1	0.6	0.6	0.4	0.4	0.5	0.7	1.2	1.3	1.1	-0.3
Young Adults	3.5	3.4	3.1	2.9	3.4	3.2	3.1	3.8	3.7	-0.1	0.9	1.0	1.0	0.8	1.1	0.7	1.1	1.2	1.3	+0.1
Rohypnol[d,k]																				
8th Grade	—	—	—	—	—	1.0	0.8	0.8	0.5	-0.3s	—	—	—	—	—	0.5	0.3	0.4	0.3	-0.1
10th Grade	—	—	—	—	—	1.1	1.3	1.2	1.0	-0.2	—	—	—	—	—	0.5	0.5	0.4	0.5	+0.1
12th Grade	—	—	—	—	—	1.1	1.2	1.4	1.0	-0.4	—	—	—	—	—	0.5	0.3	0.3	0.3	0.0
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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(Table continued on next page)

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TABLE 2-2 (cont.)
Trends in Annual and 30-Day Prevalence of Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Annual										30-Day									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98-'99 change	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98-'99 change
Alcohol[1]																				
Any use																				
8th Grade	54.0	53.7	51.6	—	—	—	—	—	—	—	25.1	26.1	26.2	—	—	—	—	—	—	—
			45.4	46.8	45.3	46.5	45.5	43.7	43.5	-0.2			24.3	25.5	24.6	26.2	24.5	23.0	24.0	+1.0
10th Grade	72.3	70.2	69.3	—	—	—	—	—	—	—	42.8	39.9	41.5	—	—	—	—	—	—	—
			63.4	63.9	63.5	65.0	65.2	62.7	63.7	+1.0			38.2	39.2	38.8	40.4	40.1	38.8	40.0	+1.2
12th Grade	77.7	76.8	76.0	—	—	—	—	—	—	—	54.0	51.3	51.0	—	—	—	—	—	—	—
			72.7	73.0	73.7	72.5	74.8	74.3	73.8	-0.5			48.6	50.1	51.3	50.8	52.7	52.0	51.0	-1.0
College Students	88.3	86.9	85.1	82.7	83.2	82.9	82.4	84.6	83.6	-1.0	74.7	71.4	70.1	67.8	67.5	67.0	65.8	68.1	69.6	+1.5
Young Adults	86.9	86.2	85.3	83.7	84.7	84.0	84.3	84.0	84.1	+0.1	70.6	69.0	68.3	67.7	68.1	66.7	67.5	66.9	68.2	+1.4
Been Drunk[1]																				
8th Grade	17.5	18.3	18.2	18.2	18.4	19.8	18.4	17.9	18.5	+0.6	7.6	7.5	7.8	8.7	8.3	9.6	8.2	8.4	9.4	+1.0
10th Grade	40.1	37.0	37.8	38.0	38.5	40.1	40.7	38.3	40.9	+2.6s	20.5	18.1	19.8	20.3	20.8	21.3	22.4	21.1	22.5	+1.4
12th Grade	52.7	50.3	49.6	51.7	52.5	51.9	53.2	52.0	53.2	+1.2	31.6	29.9	28.9	30.8	33.2	31.3	34.2	32.9	32.9	0.0
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cigarettes																				
Any use																				
8th Grade	—	—	—	—	—	—	—	—	—	—	14.3	15.5	16.7	18.6	19.1	21.0	19.4	19.1	17.5	-1.6s
10th Grade	—	—	—	—	—	—	—	—	—	—	20.8	21.5	24.7	25.4	27.9	30.4	29.8	27.6	25.7	-1.9
12th Grade	—	—	—	—	—	—	—	—	—	—	28.3	27.8	29.9	31.2	33.5	34.0	36.5	35.1	34.6	-0.5
College Students	35.6	37.3	38.8	37.6	39.3	41.4	43.6	44.3	44.5	+0.2	23.2	23.5	24.5	23.5	26.8	27.9	28.3	30.0	30.6	+0.7
Young Adults	37.7	37.9	37.8	38.3	38.8	40.3	41.8	41.6	41.1	-0.4	28.2	28.3	28.0	28.0	29.2	30.1	29.9	30.9	30.3	-0.6
Smokeless Tobacco[4]																				
8th Grade	—	—	—	—	—	—	—	—	—	—	6.9	7.0	6.6	7.7	7.1	7.1	5.5	4.8	4.5	-0.3
10th Grade	—	—	—	—	—	—	—	—	—	—	10.0	9.6	10.4	10.5	9.7	8.6	8.9	7.5	6.5	-1.0
12th Grade	—	—	—	—	—	—	—	—	—	—	—	11.4	10.7	11.1	12.2	9.8	9.7	8.8	8.4	-0.4
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Steroids[1]																				
8th Grade	1.0	1.1	0.9	1.2	1.0	0.9	1.0	1.2	1.7	+0.5sss	0.4	0.5	0.5	0.5	0.6	0.4	0.5	0.5	0.7	+0.2s
10th Grade	1.1	1.1	1.0	1.1	1.2	1.2	1.2	1.2	1.7	+0.5ss	0.6	0.6	0.5	0.6	0.6	0.5	0.7	0.6	0.9	+0.3s
12th Grade	1.4	1.1	1.2	1.3	1.5	1.4	1.4	1.7	1.8	+0.1	0.8	0.6	0.7	0.9	0.7	0.7	1.0	1.1	0.9	-0.2
College Students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Young Adults	0.5	0.4	0.3	0.4	0.5	0.3	0.5	0.4	0.6	+0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.3	+0.1

TABLE 2-3

Trends in 30-Day Prevalence of Daily Use of Various Drugs for Eighth, Tenth, and Twelfth Graders, College Students, and Young Adults (Ages 19-28)

	Daily									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	'98–'99 change
Marijuana/Hashish, daily[m]										
8th Grade	0.2	0.2	0.4	0.7	0.8	1.5	1.1	1.1	1.4	+0.3
10th Grade	0.8	0.8	1.0	2.2	2.8	3.5	3.7	3.6	3.8	+0.2
12th Grade	2.0	1.9	2.4	3.6	4.6	4.9	5.8	5.6	6.0	+0.4
College Students	1.8	1.6	1.9	1.8	3.7	2.8	3.7	4.0	4.0	0.0
Young Adults	2.3	2.3	2.4	2.8	3.3	3.3	3.8	3.7	4.4	+0.7
Alcohol[l,m]										
Any daily use										
8th Grade	0.5	0.6	0.8	—	—	—	—	—	—	—
			1.0	1.0	0.7	1.0	0.8	0.9	1.0	+0.1
10th Grade	1.3	1.2	1.6	—	—	—	—	—	—	—
			1.8	1.7	1.7	1.6	1.7	1.9	1.9	0.0
12th Grade	3.6	3.4	2.5	—	—	—	—	—	—	—
			3.4	2.9	3.5	3.7	3.9	3.9	3.4	-0.6s
College Students	4.1	4.7	3.9	3.7	3.0	3.2	4.5	3.9	4.5	+0.6
Young Adults	4.9	4.5	4.5	3.9	3.9	4.0	4.6	4.0	4.8	+0.9s
Been Drunk, daily[m]										
8th Grade	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.3	0.4	+0.1
10th Grade	0.2	0.3	0.4	0.4	0.6	0.4	0.6	0.6	0.7	+0.1
12th Grade	0.9	0.8	0.9	1.2	1.3	1.6	2.0	1.5	1.9	+0.4
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—
5+ drinks in a row in last 2 weeks										
8th Grade	12.9	13.4	13.5	14.5	14.5	15.6	14.5	13.7	15.2	+1.5s
10th Grade	22.9	21.1	23.0	23.6	24.0	24.8	25.1	24.3	25.6	+1.3
12th Grade	29.8	27.9	27.5	28.2	29.8	30.2	31.3	31.5	30.8	-0.7
College Students	42.8	41.4	40.2	40.2	38.6	38.3	40.7	38.9	40.0	+1.1
Young Adults	34.7	34.2	34.4	33.7	32.6	33.6	34.4	34.1	35.8	+1.7
Cigarettes										
Any daily use										
8th Grade	7.2	7.0	8.3	8.8	9.3	10.4	9.0	8.8	8.1	-0.7
10th Grade	12.6	12.3	14.2	14.6	16.3	18.3	18.0	15.8	15.9	+0.1
12th Grade	18.5	17.2	19.0	19.4	21.6	22.2	24.6	22.4	23.1	+0.7
College Students	13.8	14.1	15.2	13.2	15.8	15.9	15.2	18.0	19.3	+1.3
Young Adults	21.7	20.9	20.8	20.7	21.2	21.8	20.6	21.9	21.5	-0.3
1/2 pack+/day										
8th Grade	3.1	2.9	3.5	3.6	3.4	4.3	3.5	3.6	3.3	-0.3
10th Grade	6.5	6.0	7.0	7.6	8.3	9.4	8.6	7.9	7.6	-0.3
12th Grade	10.7	10.0	10.9	11.2	12.4	13.0	14.3	12.6	13.2	+0.6
College Students	8.0	8.9	8.9	8.0	10.2	8.4	9.1	11.3	11.0	-0.3
Young Adults	16.0	15.7	15.5	15.3	15.7	15.3	14.6	15.6	15.1	-0.5
Smokeless Tobacco, daily[d]										
8th Grade	1.6	1.8	1.5	1.9	1.2	1.5	1.0	1.0	0.9	-0.1
10th Grade	3.3	3.0	3.3	3.0	2.7	2.2	2.2	2.2	1.5	-0.7
12th Grade	—	4.3	3.3	3.9	3.6	3.3	4.4	3.2	2.9	-0.3
College Students	—	—	—	—	—	—	—	—	—	—
Young Adults	—	—	—	—	—	—	—	—	—	—

NOTE: See Table 2-1 for relevant footnotes

Chapter 3

STUDY DESIGN AND PROCEDURES

Monitoring the Future has a complex cohort sequential design appropriate for distinguishing and explaining three different types of change: period related, age related, and cohort related. This chapter contains a description of this research design, including the sampling plans and field procedures used in both the in-school surveys of the eighth-, tenth-, and twelfth-grade students and the follow-up surveys of young adults. Related methodological issues such as response rates, population coverage, and the validity of the measures are also discussed. We begin with a description of the design that has been used consistently over twenty-five years to survey high school seniors; then we describe the more recently instituted design for eighth and tenth graders. Finally, the designs for the *follow-up* surveys of former twelfth graders, and former eighth and tenth graders, are covered.[10,11]

RESEARCH DESIGN AND PROCEDURES FOR THE SURVEYS OF SENIORS

The data from high school seniors have been collected during the spring of each year starting with the class of 1975. Each year's data collection takes place in approximately 125 to 145 public and private high schools selected to provide an accurate representative cross-section of high school seniors throughout the coterminous United States (see Figure 3-1).

The Population under Study

The senior year of high school was chosen as an optimal point for monitoring the drug use and related attitudes of youth for several reasons. First, completion of high school represents the end of an important developmental stage in this society because it demarcates both the end of universal education and, for many, the end of living in the parental home. Therefore, it is a logical point at which to take stock of the cumulated influences of these two environments on American youth. Further, completion of high school represents the jumping-off point from which young people diverge into widely differing social environments and experiences. Senior year, then, represents a good time

[10]For a more detailed description of the study design, see Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1996). *Monitoring the Future project after twenty-two years: Design and procedures*. (Monitoring the Future Occasional Paper 38.) Ann Arbor, MI: Institute for Social Research.

[11]For a more detailed description of the full range of research objectives of Monitoring the Future, see Johnston, L. D., O'Malley, P. M., Schulenberg, J., & Bachman, J. G. (1996). *The aims and objectives of the Monitoring the Future study and progress toward fulfilling them* (2nd ed.). Ann Arbor, MI: Institute for Social Research.

to take a "before" measure that allows calculation of changes that may be attributable to the many environmental and role transitions that occur in young adulthood. Finally, there were some important practical advantages to building the original system of data collections around samples of high school seniors. The need for systematically repeated, large-scale samples from which to make reliable estimates of change requires that considerable stress be laid on cost efficiency as well as feasibility. The last year of high school constitutes the final point at which a reasonably good national sample of an age-specific cohort can be drawn and studied economically.

The Omission of Dropouts

One limitation in the study design is the exclusion of those young men and women who drop out of high school before graduation—between 15 and 20 percent of each age cohort nationally, according to U.S. Census statistics. Clearly, the omission of high school dropouts introduces biases in the estimation of certain characteristics of the entire age group; however, for most purposes, the small proportion of dropouts sets outer limits on the bias. Further, since the bias from missing dropouts should remain just about constant from year to year, their omission should introduce little or no bias in *change* estimates. Indeed, we believe the changes observed over time for those who finish high school are likely to parallel the changes for dropouts in most instances. Appendix A to Volume I addresses the likely effects of the exclusion of dropouts on estimates of prevalence of drug use and trends in drug use among the entire age cohort; the reader is referred there for a more detailed discussion of this issue.

Sampling Procedures

A multi-stage random sampling procedure is used to secure the nationwide sample of high school seniors each year. Stage 1 is the selection of particular geographic areas, Stage 2 is the selection (with probability proportionate to size) of one or more high schools in each area, and Stage 3 is the selection of seniors within each high school. Within each school, up to about 350 seniors may be included. In schools with fewer seniors, the usual procedure is to include all of them in the data collection. In larger schools, a subset of seniors is selected either by randomly sampling entire classrooms or by some other unbiased, random method. Weights are assigned to compensate for differential probabilities of selection at each stage. Final weights are normalized to average 1.0 (so that the weighted number of cases equals the unweighted number of cases overall). This three-stage sampling procedure has yielded the number of participating schools and students over the years shown in Table 3-1.

Questionnaire Administration

About ten days before the questionnaire administration date, the seniors are given flyers explaining the study. Local Institute for Social Research representatives and their assistants conduct the actual questionnaire administrations following standardized procedures that are detailed in a project instruction manual. The questionnaires are

administered in classrooms during a normal class period whenever possible; however, circumstances in some schools require the use of larger group administrations.

Questionnaire Format

Because many questions are needed to cover all of the topic areas in the study, much of the questionnaire content intended for high school seniors is divided into six different questionnaire forms that are distributed to participants in an ordered sequence that ensures six virtually identical random subsamples. (Five questionnaire forms were used between 1975 and 1988.) About one-third of each questionnaire form consists of key, or "core," variables that are common to all forms. All demographic variables, and nearly all of the drug *use* variables included in this report, are contained in this core set of measures. Many of the questions dealing with attitudes, beliefs, and perceptions of relevant features of the social environment are in a single form only, and the data are thus based on one-fifth as many cases in 1975-1988 (approximately 3,300) and on one-sixth as many cases in 1989-1999 (approximately 2,600). All tables in this report list the sample sizes upon which the statistics are based, stated in terms of the weighted number of cases (which is roughly equivalent to the actual number of cases).

RESEARCH DESIGN AND PROCEDURES FOR THE SURVEYS OF LOWER GRADES

Beginning in 1991, there was an important expansion of the study to include nationally representative samples of eighth- and tenth-grade students. Surveys at these two grade levels have been conducted on an annual basis since 1991.

In general, the procedures used for the annual in-school surveys of eighth- and tenth-grade students closely parallel those used for high school seniors, including the procedures for selecting schools and students, questionnaire administration, and questionnaire formats. A major exception is that only two different questionnaire forms were used from 1991 to 1996, expanding to four forms beginning in 1997 rather than the six used with seniors. Eighth and tenth grades receive identical forms, and, for the most part, questionnaire content is drawn from the twelfth-grade questionnaires. Thus, key demographic variables and measures of drug use and related attitudes and beliefs are generally identical for all three grades. The forms used in both eighth and tenth grades have a common core (Parts B and C) that parallels the core used in twelfth-grade forms. Many fewer questions about lifestyles and values are included in the eighth- and tenth-grade forms, in part because we think that many of these attitudes are likely to be more fully formed by twelfth grade and, therefore, are best monitored there. For the national survey of eighth graders each year, approximately 155 schools (mostly junior high schools and middle schools) are sampled, and approximately 17,000 to 19,000 students are surveyed. For the tenth graders, approximately 130 high schools are sampled, and from 14,000 to 17,000 students are surveyed.

The research design originally called for follow-up surveys of subsamples of the eighth and tenth graders participating in the study, carried out at two-year intervals, similar to the twelfth-grade follow-up samples. From 1991 to 1994, this plan influenced the design of the cross-sectional studies of eighth and tenth graders in an important way. In order to "recapture" many of the eighth-grade participants two years later in the normal tenth-grade cross-sectional study for that year, we selected the eighth-grade schools by drawing a sample of high schools and then selecting a sample of their "feeder schools" that contained eighth graders. This extra stage in the sampling process meant that many of the eighth-grade participants in, say, the 1991 cross-sectional survey were also participants in the 1993 cross-sectional survey of tenth graders. Thus, a fair amount of panel data were generated at no additional cost. However, having followed this design in 1993, we concluded that the saving in follow-up costs did not justify the complexities in sampling, administration, and interpretation. Therefore, since 1994, we have used a simplified design in which eighth-grade schools were drawn independently of the tenth-grade school sample. Further follow-ups (at two-year intervals) were conducted only on panels of students drawn from the first three cohorts of students surveyed in the eighth and tenth grades, i.e., those surveyed in school in 1991, 1992, and 1993.

When follow-up surveys of new cohorts of eighth and tenth graders were no longer being conducted, the collection of personal identification information for follow-up purposes was no longer a necessity. For confidentiality reasons, this personal information had been gathered on a tear-off sheet at the back of each questionnaire. We felt that there were potential advantages in moving toward a fully anonymous procedure for these grade levels, including the following: (a) school cooperation might be easier to obtain; (b) any suppression effect the confidential mode of administration might have could be both eliminated and quantified; and (c) if there *were* any mode of administration effect, it would be removed from the national data, which are widely used for comparison purposes in state and local surveys (nearly all of which use anonymous questionnaires), and thus make those comparisons more valid. Therefore, in 1998 for the first time, in half of the eighth- and tenth-grade schools surveyed, the questionnaires administered were made fully anonymous. Specifically the matched half-sample of schools beginning their two-year participation in Monitoring the Future in 1998 received the anonymous questionnaires, while the half-sample participating in the study for their second and final year continued to get the confidential questionnaires. A careful examination of the 1998 results, based on the two equivalent half-samples at grade 8, and also at grade 10, revealed that there was no effect of this methodological change among tenth graders, and, at most, only a very modest effect in the self-reported substance use rates among eighth graders (with prevalence rates slightly higher in the anonymous condition). The net effect of this methodological change is to increase very slightly the observed eighth-grade prevalence estimates for marijuana, alcohol, and cigarettes in 1998 from what they would have been if there was no change in questionnaire administration. For those three drugs, that means that the declines in use in 1998 may be slightly understated for the eighth graders only. In other words, the direction of the change is the same as shown in the tables, but the actual declines may be slightly larger than those shown. For example, the annual prevalence of marijuana use among eighth graders is shown to have fallen by 0.8 percentage points between 1997-1998; however, the half-sample of eighth-grade schools

receiving exactly the same type of questionnaire that was used in 1997 showed a slightly greater decline of 1.5 percentage points.

For cigarettes, this change in method appeared to have no effect on self-reported rates of daily use or half-pack per day use, and to have had only a very small effect on 30-day prevalence. Thus, for example, the 30-day prevalence of cigarette use among eighth graders is shown to have fallen 0.3 percentage points between 1997-1998; however, the half-sample of eighth-grade schools receiving exactly the same type of questionnaire that was used in 1997 showed a slightly greater decline of 0.6 percentage points. Finally, lifetime cigarette prevalence is shown as falling by 1.6 percentage points between 1997 and 1998, but in the half-sample of schools with a constant methodology, it fell by 2.6 percentage points.

We have examined the effects of mode of administration in detail in a published journal article, in which we use multivariate controls to assess the effects of the change on the eighth-grade self-report data. It generally shows even less effect than is to be found without such controls.[12]

All tables and figures in Volume I use data from both samples of eighth graders, combined. This is also true for the tenth graders (for whom we found no methodological effect) and the twelfth graders (for whom it is assumed there is no such effect since none was found among the tenth graders). In 1999 the remaining half of the participating schools (all beginning the first of their two years of participation) received anonymous questionnaires, as well. Thus, from 1999 on, all data from eighth- and tenth-grade students are gathered using anonymous questionnaires. We continue to use confidential questionnaires with twelfth graders in order to permit follow-up of those who are randomly selected into the panel studies.

RESEARCH DESIGN AND PROCEDURES FOR THE FOLLOW-UP SURVEYS OF SENIORS

Beginning with the graduating class of 1976, each senior class has been followed up annually on a continuing basis after high school for seven follow-up data collections, which corresponds to their reaching a modal age of 32.[13] From the roughly 15,000 to 17,000 seniors originally participating in a given senior class, a representative sample of 2,400 individuals is chosen for follow-up. In order to ensure sufficient numbers of drug users in the follow-up surveys, seniors reporting 20 or more occasions of using marijuana, or any use of any of the other illicit drugs in the previous 30 days, are selected with higher probability (by a factor of 3.0) than the remaining seniors. Differential weighting is then used in all follow-up analyses to compensate for these differential

[12] O'Malley, P. M., Johnston, L. D., Bachman, J. G., & Schulenberg, J. (2000). A comparison of confidential versus anonymous survey procedures: Effects on reporting of drug use and related attitudes and beliefs in a national study of students. *Journal of Drug Issues, 30*, 35-54.

[13] Further follow-ups occur (or will occur) at half-decade intervals, beginning with age 35.

sampling probabilities. Because those in the drug-using stratum receive a weight of only 0.33 in the calculation of all statistics to correct for their over-representation at the selection stage, there are actually more follow-up respondents than are reported in the weighted N's given in the tables.

The 2,400 selected respondents from each class are randomly split into two matching groups of 1,200 each; one group to be surveyed on even-numbered calendar years, and the other group to be surveyed on odd-numbered years. This two-year cycle is intended to reduce the burden on individual respondents, thus yielding a better retention rate across the years. By alternating the two half-samples, we have data from a given graduating class every year, even though any given respondent participates only every other year.

Follow-up Procedures

Using information provided by high school senior respondents on a tear-off card (containing the respondent's name, address, phone number, and the name and address of someone who would always know how to reach them), mail contact is maintained with the subset of people selected for inclusion in the follow-up panels. Newsletters are sent to them each year, and name and address corrections are requested. Questionnaires are sent to each individual biennially in the spring of each year by certified mail. A check for $10.00, made payable to the respondent, is attached to the front of each questionnaire.[14] Reminder letters and postcards are sent at fixed intervals thereafter; finally, those who have not responded receive a prompting phone call from the Survey Research Center's phone interviewing facility in Ann Arbor. If requested, a second copy of the questionnaire is sent; but no questionnaire content is administered by phone. If a respondent asks not to be bothered further, that wish is honored.

Panel Retention Rates

To date, an average of about 77% of those selected for inclusion in follow-up panels have returned questionnaires in the first follow-up after high school. The retention rate declines with time, as would be expected. The 1999 panel retention from the class of 1985—the oldest of the panels in the seven biennial follow-ups, now age 32 (14 years past their first data collection in high school)—was 53%.

Corrections for Panel Attrition

Because, to a modest degree, attrition is associated with drug use, we have introduced corrections into the prevalence of use estimates for the follow-up panels. These corrections raise the prevalence estimates from the uncorrected ones, but only slightly. We believe the resulting estimates to be the most accurate obtainable for the population

[14]Note that, for the class of 1991 and all prior classes, the follow-up checks were for $5.00. The rate was raised, beginning with the class of 1992, to compensate for the effects of inflation over the life of the study. An experiment was first conducted that suggested that the increased payment was justified based on the increased panel retention it achieved.

of high school senior graduates but still low for the age group as a whole, due to the omission of dropouts and absentees from the population covered by the original panels.[15]

Follow-up Questionnaire Format

The questionnaires used in the follow-up surveys are very much like those used in the senior year. They are optically scanned; they contain a core section on drug use and background and demographic factors common to all forms; and they have questions about a wide range of topics at the beginning and ending sections, many of which are unique to each questionnaire form. Many of the questions asked of seniors are retained in the follow-up questionnaires, and respondents are consistently mailed the same version (or form) of the questionnaire that they first received in senior year, so that changes over time in their behaviors, attitudes, experiences, and so forth can be measured. Questions specific to high school status and experiences are dropped in the follow-up, of course, and questions relevant to post-high school status and experiences are added. Thus, there are questions about college, military service, civilian employment, marriage, parenthood, and so on.

For the early follow-up cohorts, the numbers of cases on single-form questions were one-fifth the size of the total follow-up sample because five different questionnaire forms were used. Beginning with the Class of 1989, a sixth form was introduced in senior year. That new questionnaire form was first sent to follow-up respondents in 1990; single-form data since then have N's one-sixth the total follow-up sample size. In the follow-up studies, single-form samples from a single cohort are too small to make reliable estimates; therefore, in most cases where they are reported, the data from several adjacent cohorts are combined.

REPRESENTATIVENESS AND SAMPLE ACCURACY

School Participation

Schools are invited to participate in the study for a two-year period. For each school that declines to participate, a similar school (in terms of size, geographic area, urbanicity, etc.) is recruited as a replacement for that "slot." In 1999, either an original school or a replacement school was obtained in 99% of the sample units, or "slots." With very few exceptions, each school participating in the first year has agreed to participate in the second year as well. Figure 3-2 provides the year-specific school participation rates and

[15]The intent of the weighting process is to correct for the effects of differential attrition on follow-up drug use estimates. Different weights are used for different substances. Cigarettes, alcohol, and marijuana each have one weight for every follow-up of each graduating class. The weights are based on the observed differences in the distribution on an index of twelfth-grade use of the relevant substance for the follow-up sample compared to the distribution based on the full base-year sample. For example, the distribution on the index of marijuana use in the 1988 follow-up of approximately 1,000 respondents from the class of 1976 was compared to the original 1976 base-year distribution for the entire participating base-year class of 17,000 respondents; and weights were derived that, when applied to the base-year data for only those participating in the 1988 follow-up, would reproduce the original base-year frequency distribution. A similar procedure is used to determine a weight for all illicit drugs other than marijuana combined. In this case, however, an average weight is derived across graduating classes. Thus, the same weight is applied, for example, to all respondents in the follow-up of 1988, regardless of when they graduated from high school.

the percentage of "slots" filled since 1977. (The data for the years prior to 1991 are for twelfth grade only; beginning in 1991, the data are for eighth, tenth, and twelfth grades combined.) As shown in the table, replacement schools are obtained in the vast majority of cases.

There are two questions that are sometimes raised with respect to school participation rates: (1) Are participation rates so low as to compromise the representativeness of the sample? (2) Does variation in participation rates over time contribute to changes in estimates of drug use?

With respect to the first issue, the selection of replacement schools (which occurs in practically all instances of an original school refusal) almost entirely removes problems of bias in region, urbanicity, and the like, that might result from certain schools refusing to participate. Other potential biases could be more subtle, however. If, for example, it turned out that most schools with "drug problems" refused to participate, the sample would be seriously biased. And if any other single factor were dominant in most refusals, that reason for refusal also might suggest a source of serious bias. In fact, however, the reasons given for a school refusing to participate tend to be varied and are often a function of happenstance events specific to that particular year; only a very small proportion specifically object to the drug-related or "sensitive" nature of the content of the survey.

If it were the case that schools differed substantially in drug use, then which particular schools participated could have a greater effect on estimates of drug use. However, the great majority of variance in drug use lies within schools, not between schools. For example, for tenth graders in 1992, between-schools variance for marijuana use was 4%-6% of the total variance (depending on the specific measure); for inhalant use, 1%-2%; for LSD, 2%-4%; for crack cocaine, 1.0%-1.5%; for alcohol use, 4%-5%; and for cigarette use, 3%-4%. (Eighth- and twelfth-grade values are similar.) To the extent that schools tend to be fairly similar in drug use, then which particular schools participate (within a selection framework that seeks national representation) has a smaller effect on estimates of drug use. The fact that the overwhelming majority of variance in drug use lies within schools implies that, at least with respect to drug use, schools are for the most part fairly similar.[16] Further, some, if not most, of the between-schools variance is due to differences related to region, urbanicity, etc.—factors that remain well controlled in the present sampling design because of the way in which replacement schools are selected.

With respect to the second issue, the observed data from the series make it extremely unlikely that results have been significantly affected by changes in response rate. If changes in response rates seriously affected prevalence estimates, there would be noticeable bumps up or down in concert with the changing rates. But in fact the trend

[16]Among the schools that actually participated in the study, there is very little difference in substance use rates between the schools that were original selections, taken as a set, and the schools that were replacement schools. Averaged over the years 1991 through 1996, for grades 8 and 10 combined, the difference between original schools and replacement schools averaged less than one percentage point in the observed prevalence rates for monthly cigarette use, binge drinking, and annual marijuana use. (Original schools were slightly higher in cigarette and marijuana use and slightly lower in binge drinking.)

figures that result from this series of surveys are very smooth and change in a very orderly fashion from one year to the next. This suggests very strongly that the level of school-related error in the estimates does not vary much over time. Moreover, the fact that different substances trend in very different ways further refutes any likelihood that changes in response rates are affecting prevalence estimates. We have observed, for example, marijuana use decreasing while cocaine use was stable (in the early 1980s); alcohol use declining while cigarette use was stable (in the mid- to late 1980s); marijuana use increasing while inhalant use was decreasing (from 1994 to 1997). All of these patterns are explainable in terms of psychological, social, and cultural factors (as described in this and previous volumes in this series), and cannot be explained by changes in response rates.

Of course, there could be some sort of a constant bias across the years, but even in the unlikely event that there was, it seems highly improbable that it would be of much consequence for policy purposes, given that it would not affect trends and likely would have a very modest effect on prevalence rates. Thus we have a high degree of confidence that school refusal rates have not seriously biased the survey results.

At each grade level, schools are selected in such a way that half of each year's sample is comprised of schools that participated the previous year, and half is comprised of schools that will participate the next year. (Both of these samples are national replicates, meaning that each is drawn to be nationally representative by itself.) This staggered half-sample design is used to check on possible errors in the year-to-year trend estimates due to school turnover. For example, separate sets of one-year trend estimates are computed based on students in the half-sample of schools that participated in both 1997 *and* 1998, then based on the students in the half-sample that participated in both 1998 *and* 1999, and so on. Thus, each one-year *matched half-sample* trend estimate derived in this way is based on a constant set of about 65 schools (in 12th grade). When the trend data derived from the matched half-sample (examined separately for each class of drugs) are compared with trends based on the total sample of schools, the results are usually highly similar, indicating that the trend estimates are little affected by turnover or shifting refusal rates in the school samples. As would be expected, the *absolute* prevalence of use estimates for a given year are not as accurate using just the half-sample because the sample size is only half as large.

Student Participation

In 1999, completed questionnaires were obtained from 87% of all sampled students in eighth grade, 85% in tenth grade, and 83% in twelfth grade. (See Table 3-1 for response rates in earlier years.) The single most important reason that students are missed is absence from class at the time of data collection; in most cases, for reasons of cost efficiency, we do not schedule special follow-up data collections for absent students. Students with fairly high rates of absenteeism also report above-average rates of drug use; therefore, some degree of bias is introduced into the prevalence estimates by missing the absentees. Much of that bias could be corrected through the use of special weighting based on the reported absentee rates of the students who *did* respond; however, we

decided not to use such a weighting procedure because the bias in overall drug use estimates was determined to be quite small *and* because the necessary weighting procedures would have introduced greater sampling variance in the estimates. Appendix A in an earlier report[17] provides a discussion of this point, and Appendix A in the current Volume I illustrates the changes in trend and prevalence estimates that would result if corrections for absentees had been included. Of course, some students are not absent from class but simply refuse, when asked, to complete a questionnaire. However, the proportion of explicit refusals amounts to less than 1.5% of the target sample for each grade.

Sampling Accuracy of the Estimates

Confidence intervals (95%) are provided in Tables 4-1a through 4-1d (Chapter 4, Volume I) for lifetime, annual, 30-day, and daily prevalence of use for eighth-, tenth-, and twelfth-grade students. As can be seen in Table 4-1a, confidence intervals for lifetime prevalence for seniors average about ±1.5% across a variety of drug classes. That is, if we took a large number of samples of this size from the universe of all schools containing twelfth graders in the coterminous United States, 95 times out of 100 the sample would yield a result that would be 1.5 percentage points *or less* divergent from the result we would get from a comparable massive survey of *all* seniors in *all* schools. This is a high level of sampling accuracy, and it should permit detection of fairly small changes from one year to the next. Confidence intervals for the other prevalence periods (past 12 months, past 30 days, and current daily use) are generally smaller than those for lifetime use. In general, confidence intervals for eighth and tenth graders are very similar to those observed for twelfth graders. Some drugs are measured on only one or two forms (smokeless tobacco, PCP, nitrites, and others, as indicated in Table 2-1 footnotes); these drugs will have somewhat larger confidence intervals due to their smaller sample sizes. Appendix C of Volume I contains information for the interested reader on how to calculate confidence intervals around other point estimates; it also provides the information needed to compare trends across time or to test the significance of differences between subgroups in any given year.

VALIDITY OF THE MEASURES OF SELF-REPORTED DRUG USE

Are sensitive behaviors such as drug use honestly reported? Like most studies dealing with sensitive behaviors, we have no direct, totally objective validation of the present measures; however, the considerable amount of existing inferential evidence strongly suggests that the self-report questions produce largely valid data. A more complete discussion of the contributing evidence that leads to this conclusion may be found in other publications; here we will only briefly summarize the evidence.[18]

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[17]Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1984). *Drugs and American high school students: 1975-1983.* DHHS (ADM) 85-1374. Washington, D.C.: U.S. Government Printing Office.

[18]Johnston, L. D., & O'Malley, P. M. (1985). Issues of validity and population coverage in student surveys of drug use. In B. A. Rouse, N. J. Kozel, & L. G. Richards (Eds.), *Self-report methods of estimating drug use: Meeting current challenges to validity* (NIDA Research Monograph No. 57 (ADM) 85-1402). Washington, D.C.: U.S. Government Printing Office; Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1984). *Drugs and American high school students: 1975-1983.* DHHS (ADM) 85-1374.

First, using a three-wave panel design, we established that the various measures of self-reported drug use have a high degree of reliability—a necessary condition for validity.[19] In essence, respondents were highly consistent in their self-reported behaviors over a three- to four-year time interval. Second, we found a high degree of consistency among logically-related measures of use within the same questionnaire administration. Third, the proportion of seniors reporting some illicit drug use by senior year has reached two-thirds of all respondents in peak years and nearly 80% in some follow-up years, constituting *prima facie* evidence that the degree of under-reporting must be very limited. Fourth, the seniors' reports of use by their unnamed friends—about whom they would presumably have less reason to distort reports of use—has been highly consistent with self-reported use in the aggregate in terms of both prevalence *and* trends in prevalence, as will be discussed later in this report. Fifth, we have found self-reported drug use to relate in consistent and expected ways to a number of other attitudes, behaviors, beliefs, and social situations—in other words, there is strong evidence of "construct validity." Sixth, the missing data rates for the self-reported use questions are only very slightly higher than for the preceding nonsensitive questions, in spite of explicit instructions to respondents to leave blank those drug use questions they felt they could not answer honestly. Seventh, an examination of consistency in reporting of lifetime use conducted on the long-term panels of graduating seniors found quite low levels of recanting of earlier-reported use of the illegal drugs.[20] There was a higher level of recanting for the psychotherapeutic drugs, which we interpreted as suggesting that adolescents actually may overestimate their use of some of these drugs because of misunderstanding definitions which get cleared up as they get older. Finally, the great majority of respondents, when asked, say they would answer such questions honestly if they were users.[21]

This is not to argue that self-reported measures of drug use are valid in all cases. In the present study we have gone to great lengths to create a situation and set of procedures in which students feel that their confidentiality will be protected. We have also tried to present a convincing case as to why such research is needed. We think the evidence suggests that a high level of validity has been obtained. Nevertheless, insofar as any remaining reporting bias exists, we believe it to be in the direction of under-reporting.

Washington, D.C.: U.S. Government Printing Office; Wallace, J. M., Jr., & Bachman, J. G. (1993). Validity of self-reports in student-based studies on minority populations: Issues and concerns. In M. de LaRosa (Ed.), *Drug abuse among minority youth: Advances in research and methodology*. NIDA Research Monograph. Rockville, MD: National Institute on Drug Abuse.

[19]O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (1983). Reliability and consistency in self-reports of drug use. *International Journal of the Addictions, 18*, 805-824.

[20]Johnston, L. D. & O'Malley, P. M. (1997). The recanting of earlier reported drug use by young adults. In Harrison, L. (Ed.), *The validity of self-reported drug use: Improving the accuracy of survey estimates* (pp. 59-80). (NIDA Research Monograph 167, pp 59-79). Rockville, MD: National Institute on Drug Abuse.

[21]For a discussion of reliability and validity of student self-report measures of drug use like those used in Monitoring the Future across varied cultural settings, see also Johnston, L. D., Driessen, F. M. H. M., & Kokkevi, A. (1994). *Surveying student drug misuse: A six-country pilot study*. Strasbourg, France: Council of Europe.

Thus, we believe our estimates to be lower than their true values, even for the obtained samples, but not substantially so.

One procedure we undertake to help assure the validity of our data is worth noting. We check for logical inconsistencies in the triplets of answers about the use of each drug (i.e., about lifetime, past year, and past 30-day use), and if a respondent exceeds a minimum number of inconsistencies, his or her record is deleted from the dataset. Similarly, we check for improbably high rates of use of multiple drugs and delete such cases, on the assumption that the respondents are not taking the task seriously. Relatively few cases are eliminated for these reasons.

Consistency and the Measurement of Trends

One further point is worth noting in a discussion of the validity of the findings. The Monitoring the Future project is designed to be sensitive to changes from one time period to another. One great strength of this study, in our opinion, is that the measures and procedures have been standardized and applied consistently across many years. To the extent that any biases remain because of limits in school and/or student participation, and to the extent that there are distortions (lack of validity) in the responses of some students, it seems very likely that such problems will exist in much the same way from one year to the next. In other words, biases in the survey estimates will tend to be consistent from one year to another, which means that our measurement of *trends* should be affected very little by any such biases. The smooth and consistent nature of most trend curves reported for the various drugs provides rather compelling empirical support for this assertion.

TABLE 3-1

Sample Sizes and Response Rates

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Twelfth Grade																									
Number public schools	111	108	108	111	111	107	109	116	112	117	115	113	117	113	111	114	117	120	121	119	120	118	125	124	124
Number private schools	14	15	16	20	20	20	19	21	22	17	17	16	18	19	22	23	19	18	18	20	24	21	21	20	19
Total number schools	125	123	124	131	131	127	128	137	134	134	132	129	135	132	133	137	136	138	139	139	144	139	146	144	143
Total number students	15,791	16,678	18,436	18,924	16,662	16,524	18,267	18,348	16,947	16,499	16,502	15,713	16,843	16,795	17,142	15,676	15,483	16,251	16,763	15,929	15,876	14,824	15,963	15,780	14,056
Student response rate	78%	77%	79%	83%	82%	82%	81%	83%	84%	83%	84%	83%	84%	83%	86%	86%	83%	84%	84%	84%	84%	83%	83%	82%	83%
Tenth Grade																									
Number public schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	107	106	111	116	117	113	113	110	117
Number private schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	19	17	14	22	20	18	19	23
Total number schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	121	125	128	130	139	133	131	129	140
Total number students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14,996	14,997	15,516	16,080	17,285	15,873	15,778	15,419	13,885
Student response rate	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	87%	88%	86%	88%	87%	87%	86%	87%	85%
Eighth Grade																									
Number public schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	131	133	126	116	118	122	125	122	120
Number private schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	26	30	34	34	30	27	27	30
Total number schools	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	162	159	156	150	152	152	152	149	150
Total number students	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17,844	19,015	18,820	17,708	17,929	18,368	19,066	18,667	17,287
Student response rate	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	90%	90%	90%	89%	89%	91%	89%	88%	87%

SOURCE: The Monitoring the Future Study, the University of Michigan.

FIGURE 3-1

Counties Included in One Year's Data Collection

NOTE: Counties may contain multiple schools and up to three grade levels each.